MAY 1953

The Paper Industry

South's Progress

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PRODUCTS and SERVICES for the PAPER INDUSTRY

FROM raw water through final recovery, Nalco chemicals and services help produce better pulp and paper products...speed processing...save time and money. Details on the chemicals and services outlined here are contained in Nalco Bulletin 55. Write for your copy today—or ask your Nalco Representative for answers to your problems.

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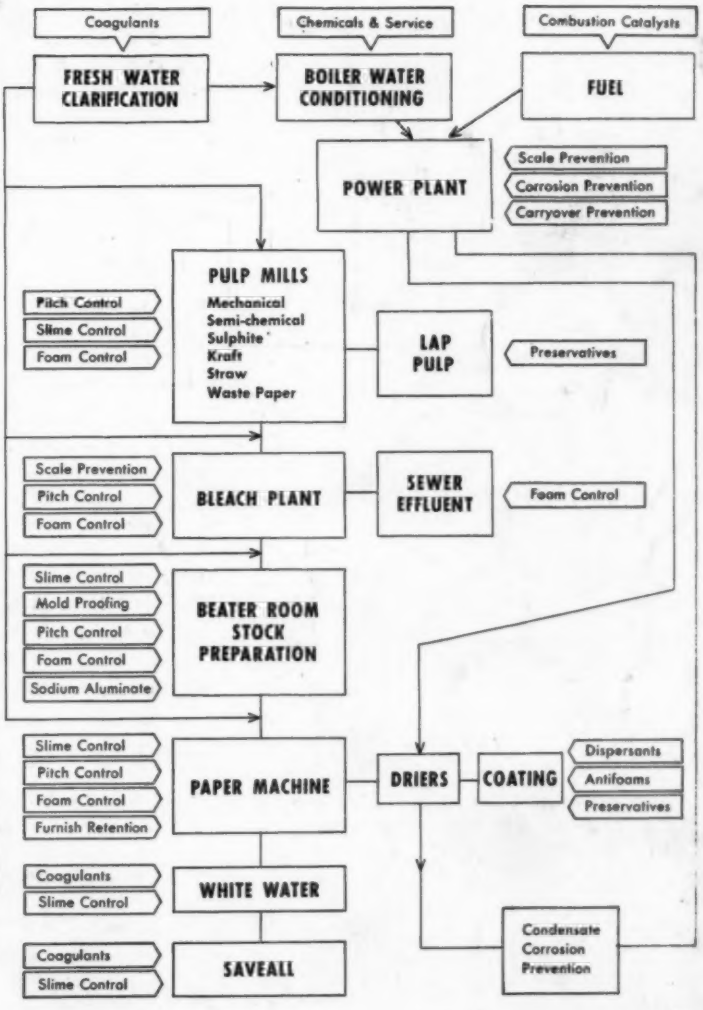
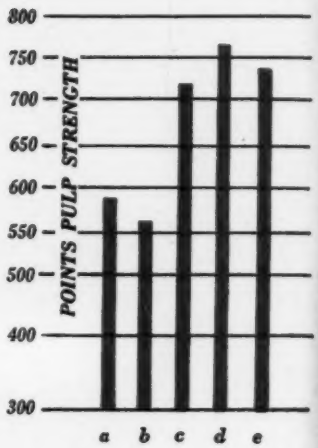
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

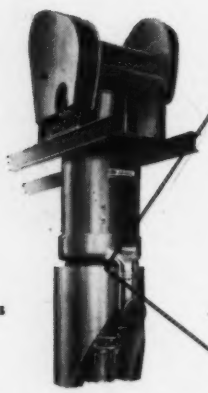


THE Nalco SYSTEM • Serving the Paper Industry through Practical Applied Science

What happens to SCREEN REJECTS in your mill ?

PULP CONTAINING 5% REFINED REJECTS SHOWS 7½% MORE STRENGTH THAN NORMAL HIGH YIELD KRAFT—WITH HIGH QUALITY APPEARANCE RETAINED





medium size
J-C Zenith Press

a. 100% rejects — one pass in high density refiner

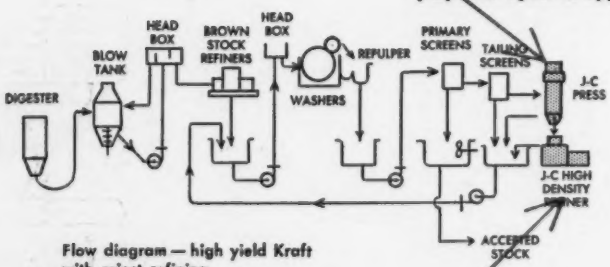
b. 100% rejects — two passes in high density refiner

c. Normal high yield Kraft pulp

d. 95% C & 5% A

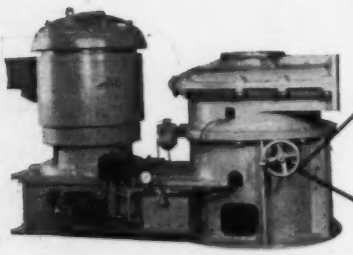
e. 95% C & 5% B

Points pulp strength = 2 × Mullen plus tear. (Note that pulp containing refined rejects is stronger than normal pulp and equal in appearance.)



Flow diagram — high yield Kraft with reject refining

RECENT TESTS PROVE A SUPERIOR PULP RESULTS FROM MIXING A PULP NOW LOST (REJECTS) WITH NORMAL HIGH YIELD KRAFT



J-C 015 Refiner

You can have similar savings with the simple installation of a J-C PULP PRESS and 015 HIGH DENSITY REFINER in your present system. Here's how the J-C system makes possible these remarkable savings . . .

After leaving the tailing screens the rejects are pressed to high consistency, processed in the specially designed 015 refiner and returned to the blow tank. A wide separation between the plates allows the 015 refiner to operate at high density with less power per ton of pulp. A striking feature of the 015-refiner is its inherent ability to produce long fibers, resulting in better tear.

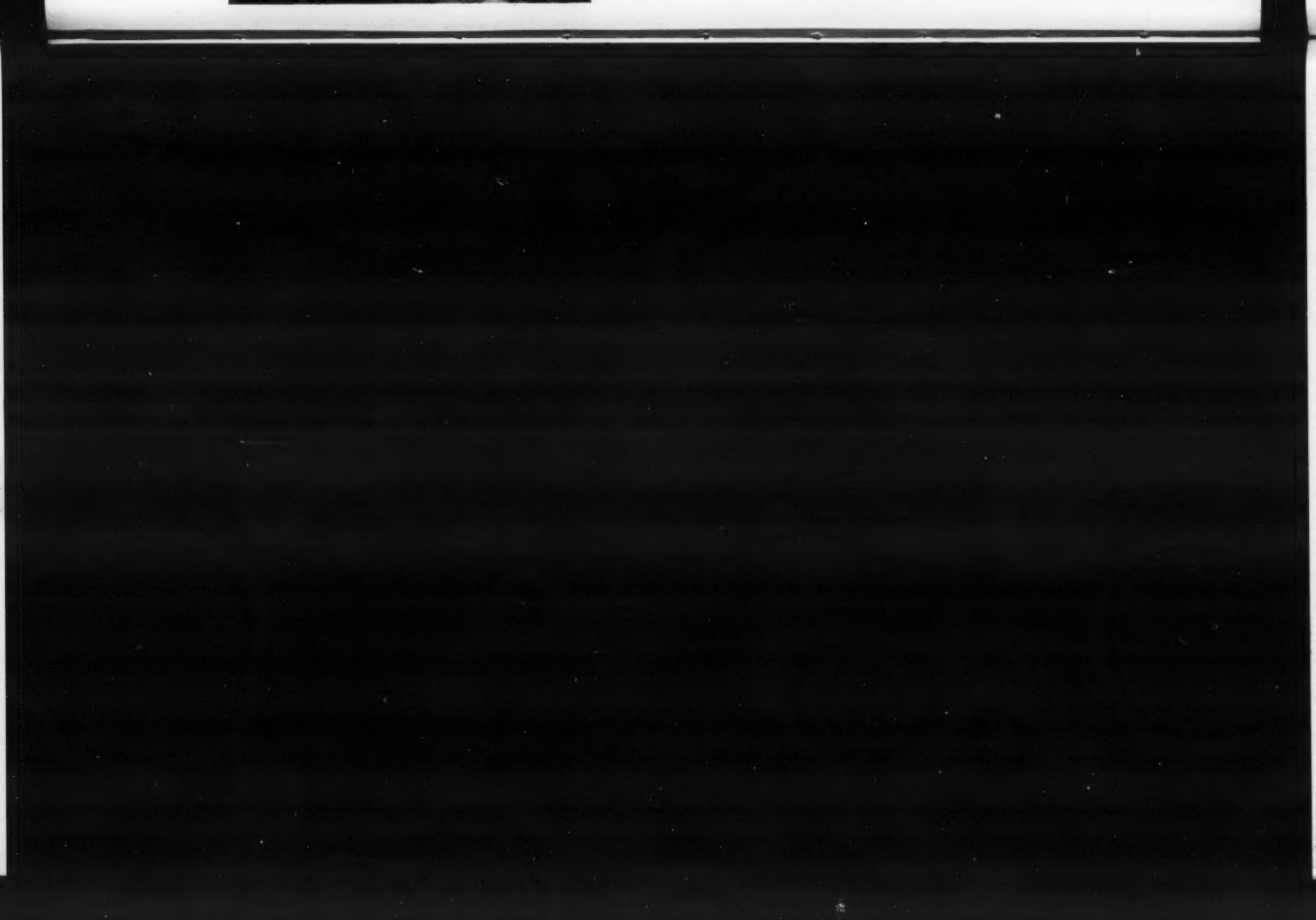
THESE PLUS FEATURES OF THE J-C PRESS AND REFINER SYSTEM ADD UP TO EXTRA SAVINGS:

- By eliminating rejects, digester capacity is improved; cost of chemicals per ton is reduced.
- Reduces amount of dilution in black liquor.
- Output of mill is increased by amount of rejects (5%).

Our engineers and facilities are at your service. For information, write Dept. P.

J-C **JACKSON & CHURCH CO.** SAGINAW, MICHIGAN

Work well done since eighty-one



NOW! A Better Piping Hook-Up for Paper Machines

BARCO *Flexible* BALL JOINTS

"MOVES IN ANY DIRECTION"

THESE pictures show how a number of paper mills and leading machine builders are now using Barco Ball Joints to make trouble-free *flexible* piping connections to dryers.

OVERCOMES "CONNECTOR FAILURES"—Failures experienced in other flexible connectors have been traced to a characteristic *"double twisting"* action set up by expansion and contraction in long steam supply and condensate return headers.

ACCOMMODATES ALL MOVEMENT—Barco Ball Joints readily accommodate movement in any direction, *including swivel action.* Used in combination with standard iron pipe, they provide leakproof flexible connections for steam and condensate lines that are practically indestructible.

AVAILABLE NOW—Barco engineers and representatives are ready with recommendations for hook-ups and joints to meet your particular needs. *Call or write today!*

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Only leather has the resiliency and flexibility to maintain close contact with the face of the pulley across the entire width of the belt.

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Only flat leather belting has the controlled stretch and high coefficient of friction needed to run true on this type of drive.

Cone

Only a flat leather belt, properly engineered for this service, can continually grip these pulleys and run true.

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Only leather can long resist the wear on face and edges, and provide the required pulley grip without heavy tension.

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Only flat leather belting has the lateral firmness to resist the wear on the edges caused by the shifter fork.

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Leather belting can be shifted from one set of pulleys to another for years and years without showing serious wear.

Also . . . round, link and V belting, belt lacing, dressings, cements, specialty leathers. Packings—Leather and Rubber. Textile Leathers.

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RESEARCH®—*Premium* quality leather belting, tanned and curried by an exclusive process. Recommended for small-diameter pulleys, short-center drives, severe idler drives, high-speed drives, multiple-pulley serpentine drives.

SPARTAN®—A combination tannage that has high resistance to water, steam, oil, acid and alkali fumes. Widely used in paper mills and bleacheries.

GRAKO® Sprazon

ORIGINAL BELT DRESSING IN A SPRAY CONTAINER

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B-3

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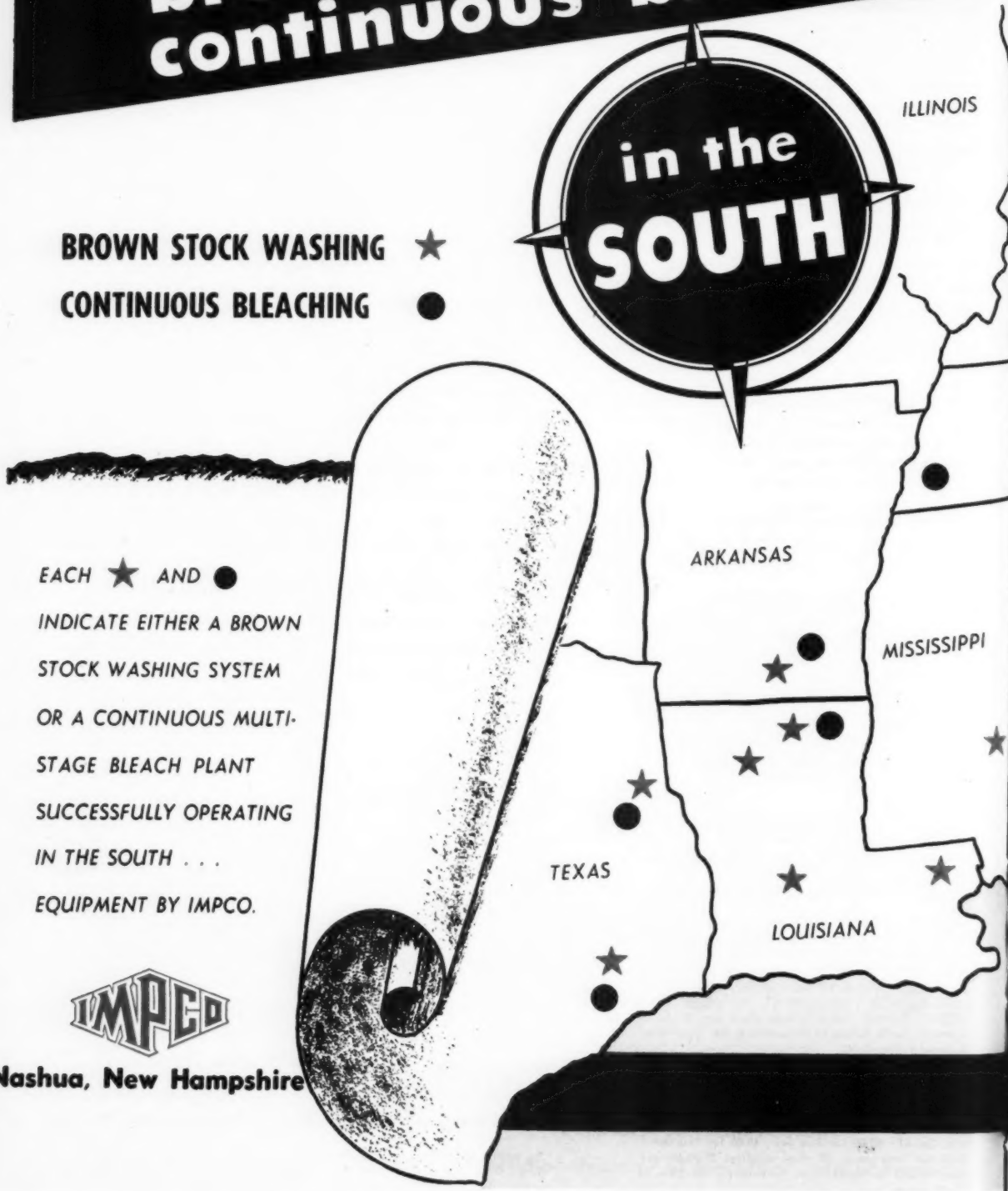
continuous bleaching



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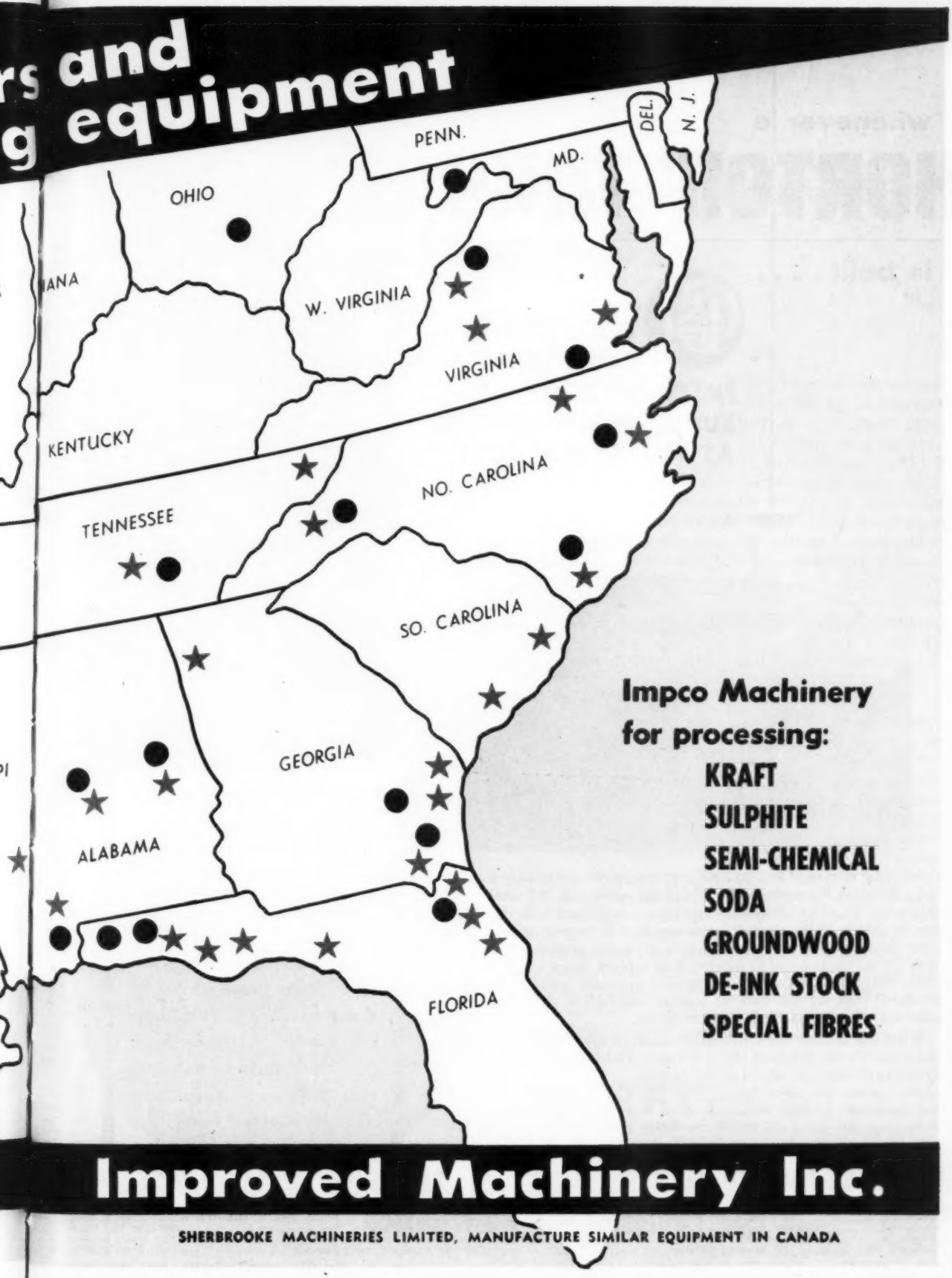

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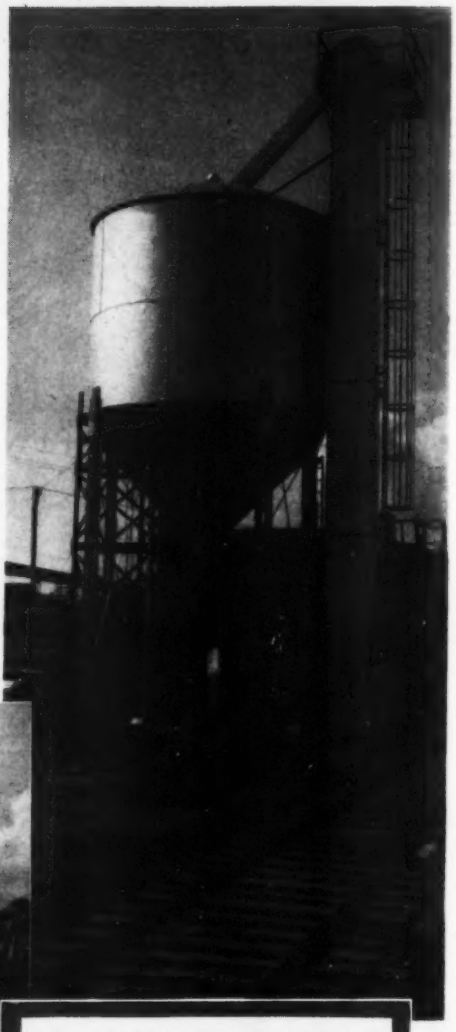

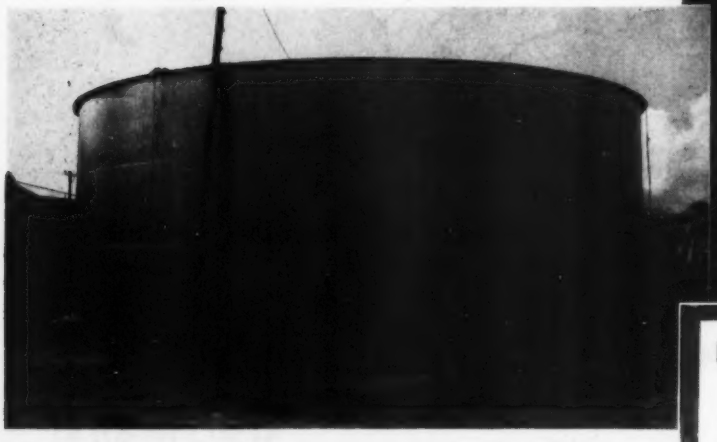

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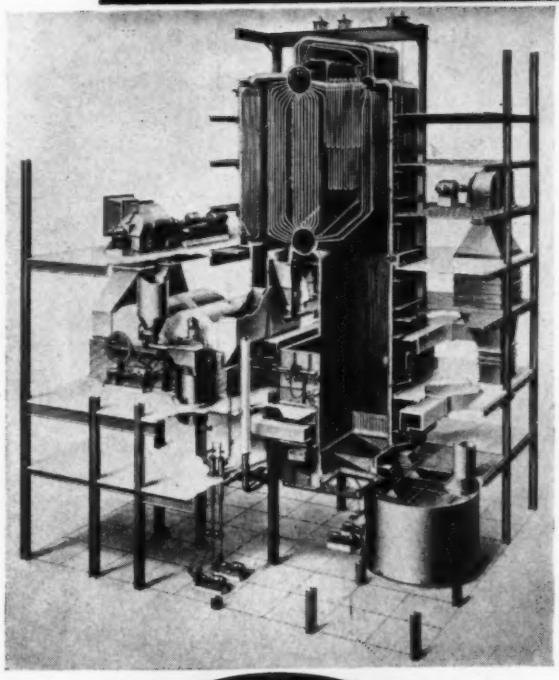
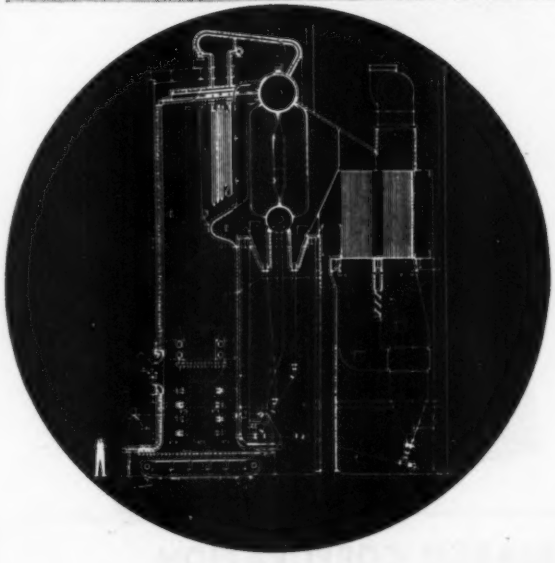


C-E RECOVERY UNITS with an aggregate capacity of well over 50,000,000 lbs. of dry solids per 24 hours are now in service, under construction or on order. They vary in capacity up to 350 tons and for operating steam pressures up to 875 psi with temperatures to 825 F.

C-E Recovery Units are in service in many of the best known mills throughout the United States and Canada; other installations are in Europe and Latin America. Their repeat order record is exceptional. Three large companies have purchased C-E Recovery Units on four different occasions, two companies have ordered three times and eight companies have ordered twice. The reliability, efficiency and operating economy they anticipated from their first C-E Units became the reality upon which future orders were predicated.



C-E BARK BURNING UNITS bring to the pulp and paper industry a revolutionary bark burning method – proved in service – that will soon be paying impressive dividends to leading mills all over the country. Its primary feature is turbulent-suspension burning. Bark or hogged wood is fed into the furnace by specially designed spreader units located at a considerable distance above grate level. Preheated air, introduced through nozzles at various furnace levels, assures extreme turbulence and, therefore, rapid and efficient combustion. Most of the bark burns in suspension – the balance burns quickly and evenly on the stoker grate.

Reports from the initial installation – now in service for more than a year – show that overall savings have been very substantial, that performance has been excellent and that availability is exceptionally high – actually better than 99 per cent.

OTHER C-E PRODUCTS for the pulp and paper industry include all types of boilers and fuel burning equipment and C-E Flash Drying Equipment which has been very successfully applied to existing lime burning operations to increase capacity and efficiency. B-643

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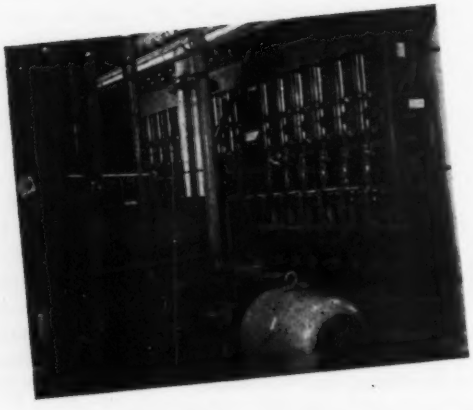

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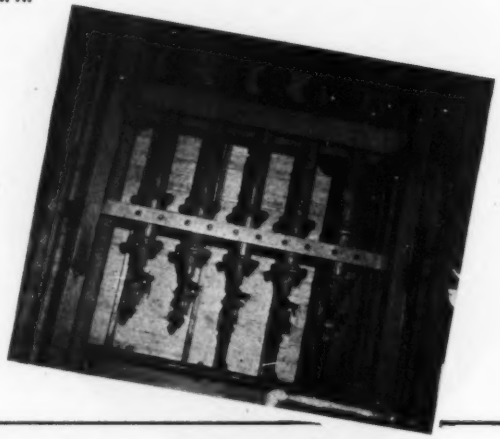

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"You cannot put the same shoe on every foot"

—Shakespeare

Shakespeare probably wasn't thinking of PUMPS or their applications in Pulp and Paper Mills,

but his wise old saying aptly applies there. In other words, and as Warren has contended for many years, "off-the-shelf" pumps do not, in most cases, ideally fit into the average mill's pumping program. In this highly specialized field, an intimate knowledge of both your product and processes is especially desirable if the pump manufacturer is to engineer and build pumps to meet your exacting requirements.

Warren has that intimate knowledge, backed by experience in serving hundreds of the Nation's leading mills, many over a long period of years.

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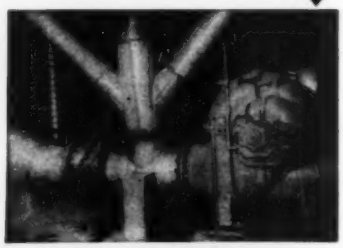
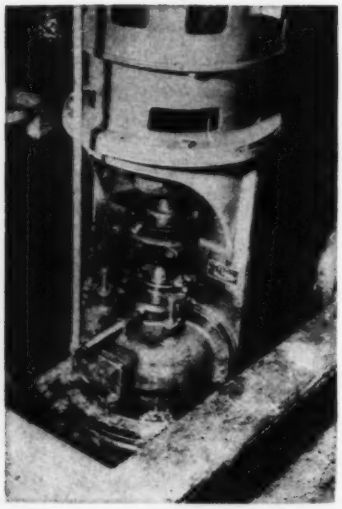
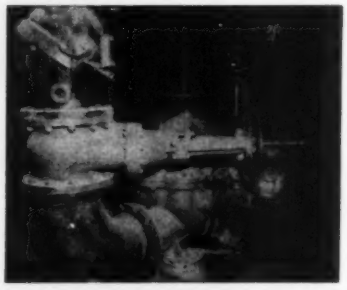


Main and auxiliary fan pumps, both Warren.

Three Warren Steam Pump Co. pumps handling white water from board machine.



Warren Vertical Pump handling stock from dry broke beater to filler chest.



Warren pump type 12-DL-18 pumping black liquor at 2700 gpm against 55 ft. head off No. 2 washer foot box.

PP-28

WARREN PUMPS

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B&W Intermediate Alloy and Stainless CROLOY Tubing Steels

B&W offers a wide range of Intermediate CROLOY and Stainless CROLOY Tubing Steels which permit utmost discrimination in selection of composition. These grades or types have different characteristics and qualities which determine their most economical specific use. Proper selection can be made only after due consideration of all factors involved in a particular application. The metallurgists, salesmen, and technical staff of B&W will welcome the opportunity to assist in the selection of the proper grade or grades best suited to meet specific conditions of service; also, B&W Bulletins TB-1, TB-6, and TB-9, containing a wealth of data on these analyses, are yours for the asking.

ANALYSES OF THE B&W INTERMEDIATE CROLOY TUBING STEELS FOR HIGH-TEMPERATURE SERVICE

TYPE	CARBON	MANG.	SUL.	PHOS.	SILICON	CHROMIUM	MOLY.
CROLOY ½	0.10-0.20	0.30-0.60	0.05	0.04	0.10-0.30	0.50- 0.70	0.45-0.65
CROLOY 1	0.15	0.30-0.60	0.04	0.04	0.30	0.80- 1.10	0.45-0.65
CROLOY 1½	0.15	0.30-0.60	0.03	0.03	0.50-1.00	1.00- 1.50	0.45-0.65
CROLOY 1¾	0.15	0.30-0.60	0.03	0.03	0.45-0.75	1.50- 2.00	0.60-0.80
CROLOY 2	0.15	0.30-0.60	0.03	0.03	0.50	1.75- 2.25	0.45-0.65
CROLOY 2¼	0.15	0.30-0.60	0.03	0.03	0.50	2.00- 2.50	0.90-1.10
CROLOY 3M	0.15	0.30-0.60	0.03	0.03	0.50	2.75- 3.25	0.80-1.00
CROLOY 5	0.15	0.30-0.60	0.03	0.03	0.50	4.00- 6.00	0.45-0.65
CROLOY 5-Si	0.15	0.30-0.60	0.03	0.03	1.00-2.00	4.00- 6.00	0.45-0.65
CROLOY 5-Ti*	0.12	0.30-0.60	0.03	0.03	0.50	4.00- 6.00	0.45-0.65
CROLOY 5-Cb*	0.12	0.30-0.60	0.03	0.03	0.50	4.00- 6.00	0.45-0.65
CROLOY 7	0.15	0.30-0.60	0.03	0.03	0.50-1.00	6.00- 8.00	0.45-0.65
CROLOY 8M	0.15	0.30-0.60	0.03	0.03	1.00	7.00- 9.00	0.90-1.10
CROLOY 9M†	0.15	0.30-0.60	0.03	0.03	1.00	8.00-10.00	0.90-1.10

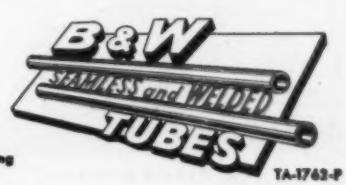
NOTE: Percentages are maximum unless range is given.
*Titanium stabilized—Ti 4 x C min., 70% max.; Columbium stabilized—Cb 8 to 10 x C.
†Can also be furnished with 1.20-1.50% Mo, .50% Si—designation CROLOY 9.

ANALYSES OF THE B&W STAINLESS CROLOY TUBING STEELS

B&W Croloy	AISI (A) Type Number	% Carbon Max.	% Manganese Max.	% Phosphorus Max.	% Sulphur Max.	% Silicon Max.	% Chromium	% Nickel	% Molybdenum	% Other Element
Croloy 18-8 H-C	302	.08-.20	2.00	.04	.03	1.00	17.0-19.0	8.0-10.0	..	..
Croloy 18-8 SI	302B	.08	2.00	.03	.03	2.00-3.00	17.0-19.0	11.0-14.0	..	..
Croloy 18-8 F-M	303	.15	2.00	.03	.04	1.00	17.0-19.0	8.0-11.0	..	Se .07-.20
Croloy 18-8 S	304	.08	2.00	.03	.03	.75	18.0-20.0	8.0-11.0	..	..
Croloy 18-12	305	.12	2.00	.04	.03	1.00	17.0-19.0	10.0-13.0	..	..
Croloy 20-10	308	.08	2.00	.03	.03	.50	19.0-22.0	10.0-12.0	..	..
Croloy 25-12	309	.08	2.00	.025	.025	1.00	22.0-26.0	12.0-15.0	..	..
Croloy 25-12 Cb	..	.08	2.00	.025	.025	1.00	22.0-26.0	12.0-15.0	..	Cb 8XC-1.00
Croloy 25-20	310	.15	2.00	.03	.03	.75	24.0-26.0	19.0-22.0	..	(B)
Croloy 16-13-3	316	.08	2.00	.03	.03	.75	16.0-18.0	11.0-14.0	2.0-3.0	..
Croloy 16-13-3 Cb	..	.08	2.00	.03	.03	.75	16.0-18.0	11.0 Min.	2.0-3.0	Cb 9XC-1.00
Croloy 18-13-3	317	.08	2.00	.03	.03	.75	18.0-20.0	11.0-14.0	3.0-4.0	..
Croloy 18-8 Ti	321	.08	2.00	.03	.03	.75	17.0-20.0	9.0-13.0	..	Ti 5XC-.60
Croloy 18-8 Cb	347	.08	2.00	.03	.03	.75	17.0-20.0	9.0-13.0	..	Cb 10XC-1.00
Croloy 12 T	403	.15	1.00	.03	.03	.75	11.5-13.0	..	..	(C)
Croloy 12 Al	405	.08	1.00	.03	.03	.75	11.5-13.5	.50 Max.	..	Al .10-.30
Croloy 12	410	.15	1.00	.03	.03	.75	11.5-13.5	.50 Max	(D)	..
Croloy 12-2	414	.15	1.00	.04	.03	1.00	11.5-13.5	1.25-2.50	..	..
Croloy 18	430	.12	1.00	.03	.03	.75	14.0-18.0	.50 Max.	..	..
Croloy 22	443	.20	1.00	.03	.03	.75	18.0-23.0	.50 Max.	..	Cu .90-1.25
Croloy 27	446	.20	1.50	.03	.03	.75	23.0-30.0	.50 Max.	..	Nz.10-.25

A. For tube manufacturing reasons the analysis of the B&W Croloys may vary slightly from that of the AISI Type Number.
B. Can be furnished stabilized by addition of columbium.
C. Turbine Quality.
D. Can be furnished without or with addition of either ½ or 1 per cent molybdenum as an alloying element.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing



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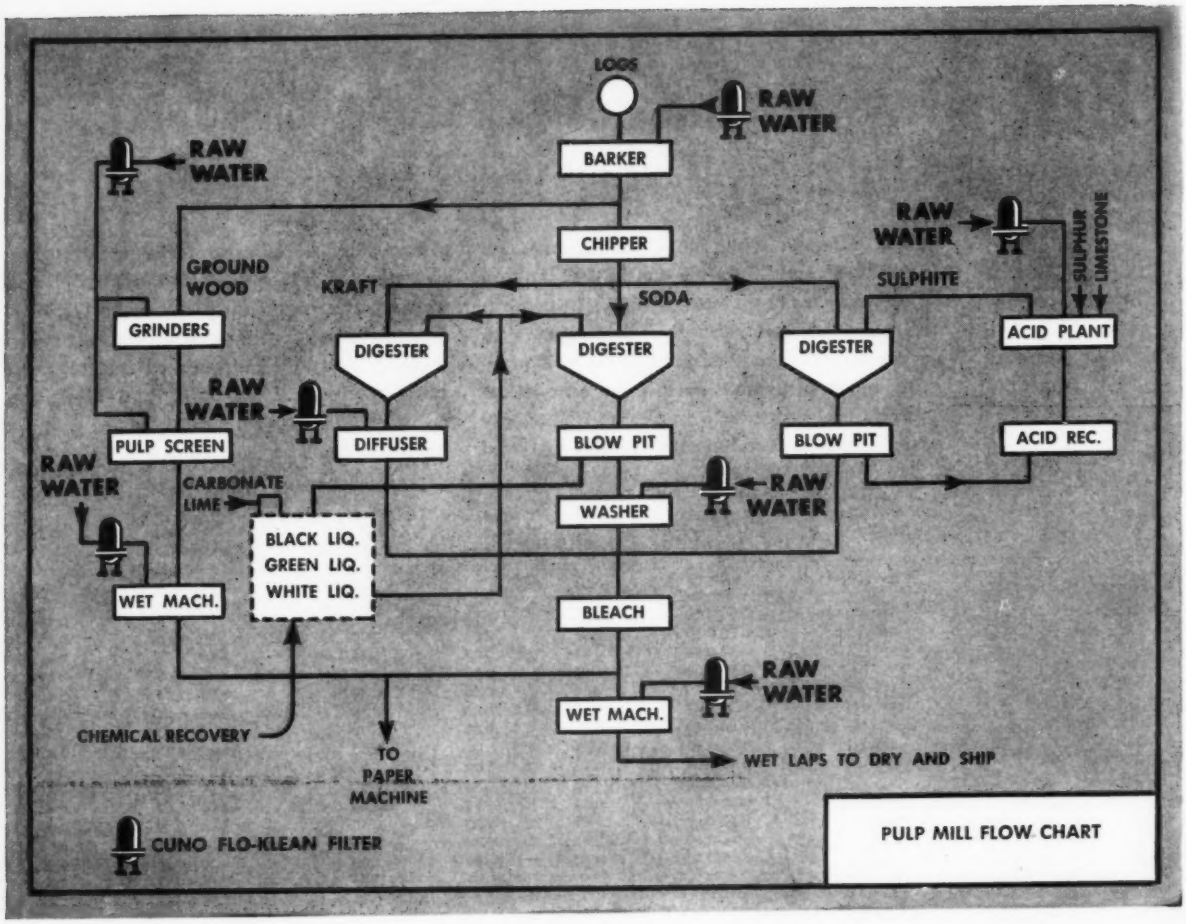

Plan for longer uninterrupted production

When paper and pulp mills have clogged showers or damaged wet felts and Fourdrinier wires, it takes time and money to get going again.

Paper and pulp men have learned from experience that they can avoid costly down-time by installing Cuno FLO-KLEAN filters in their water systems. FLO-KLEAN filters remove harmful solids from river, lake or well water before equipment can be damaged.

You can install a FLO-KLEAN and forget about down-time caused by dirty water. Automatic and continuously self-cleaning, FLO-KLEAN filters are available to handle between 200 and 100,000 gallons of water per minute—with no interruption of flow, and no loss of backwash water. Pressure loss is negligible in this corrosion- and abrasion-resistant unit.

To find out how FLO-KLEAN can protect your equipment and save money write for free FLO-KLEAN bulletin to the Cuno Engineering Corporation, Dept. 394F, Meriden, Conn. F.3.3

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Removes More Sizes of Solids From More Kinds of Fluids

AUTO-KLEAN (disc-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound)

Loads Two for One with TD-9

MORE LOADS PER TRIP...MORE WOOD PER DAY. Ed Jenkins' International TD-9 brings another load out to a dry spot for the trucks to haul away.

How International power pays off for Arkansas lumberman

Down Crossett, Arkansas way, Ed Jenkins harnesses International power to haul his lumber to dry spots where trucks can pick it up—and to double his output.

Ed has an International TD-9 crawler on the job . . . and here's what he says about it:

"My TD-9 has the power and I can load two trucks now, where with the crawler I had before, I could load only one."

In these days of rising costs, look into the ways International power can help you increase your output. There are International tractors and power units to meet every logging job. See your International Industrial Distributor and get the details on International *"Power that Pays."*

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Mill-Demonstrated Continuous Pulping

SEMICHEMICAL • NONCHEMICAL

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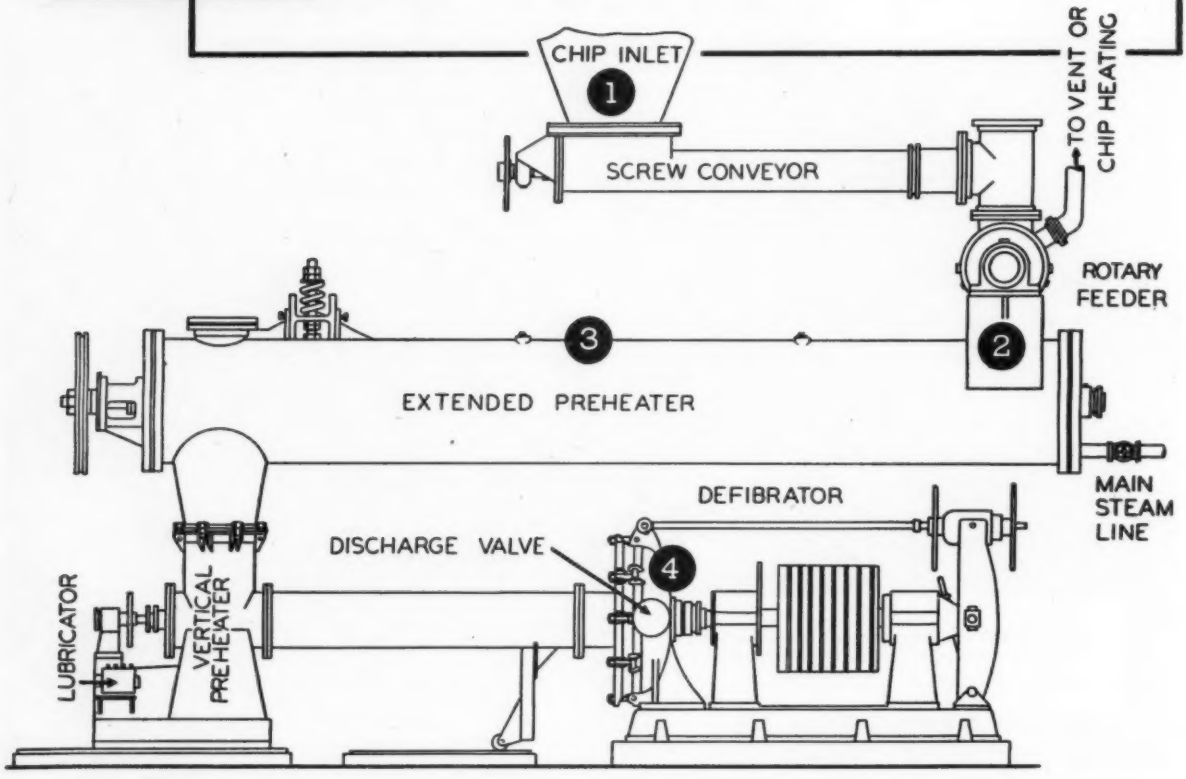

1 Drained, pre-soaked chips enter here.

2 Rotary feeder, developed by American Defibrator, provides steam seal against pressures up to 150 psig. with no plug forming or blow-back. Chips are gravity fed without damage to fibers, change in moisture balance, or loss of liquor.

3 Chips are uniformly pressure cooked throughout as they are conveyed through the preheater, where time and temperature are controlled.

4 Softened chips are easily defibrated and pass through a blow valve to a cyclone where pulp is pumped to secondary refining.

Further details on request.

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Major Installations in the South

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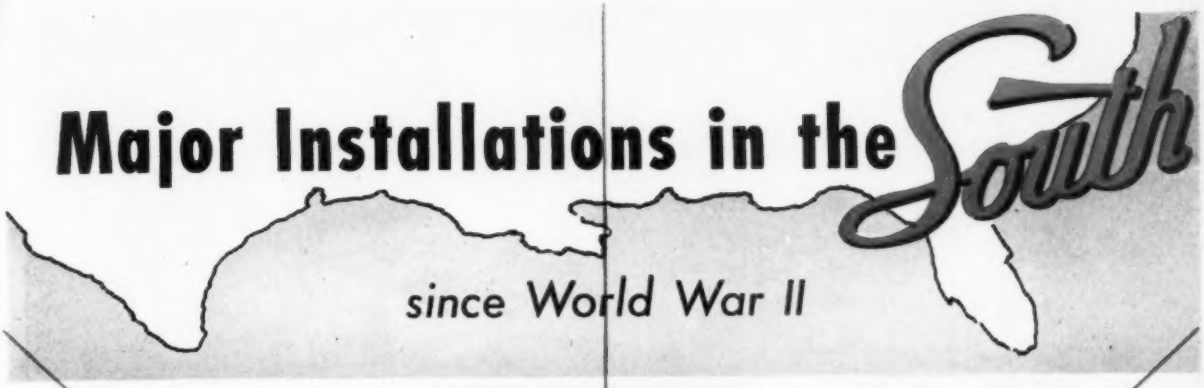

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Brown Paper Mill Co. Inc., Monroe.
Calcasieu Paper Co. Inc., Elizabeth.

MISSISSIPPI
International Paper Co., Moss Point.
International Paper Co., Creole.
International Paper Co., Natchez.

OKLAHOMA
National Gypsum Co., Pryor.

ARKANSAS
International Paper Co., Camden.
Crossett Paper Mills, Crossett.

TENNESSEE
Tennessee Paper Mills, Chattanooga.
Kimberly-Clark Corp., Memphis.
Bowaters Southern Paper Co., Calhoun.

FLORIDA
St. Regis Paper Co., N. Pensacola.
Hudson Pulp & Paper Corp., Palatka.
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St. Joe Paper Co., Port St. Joe.
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Rome Kraft Co., Rome.

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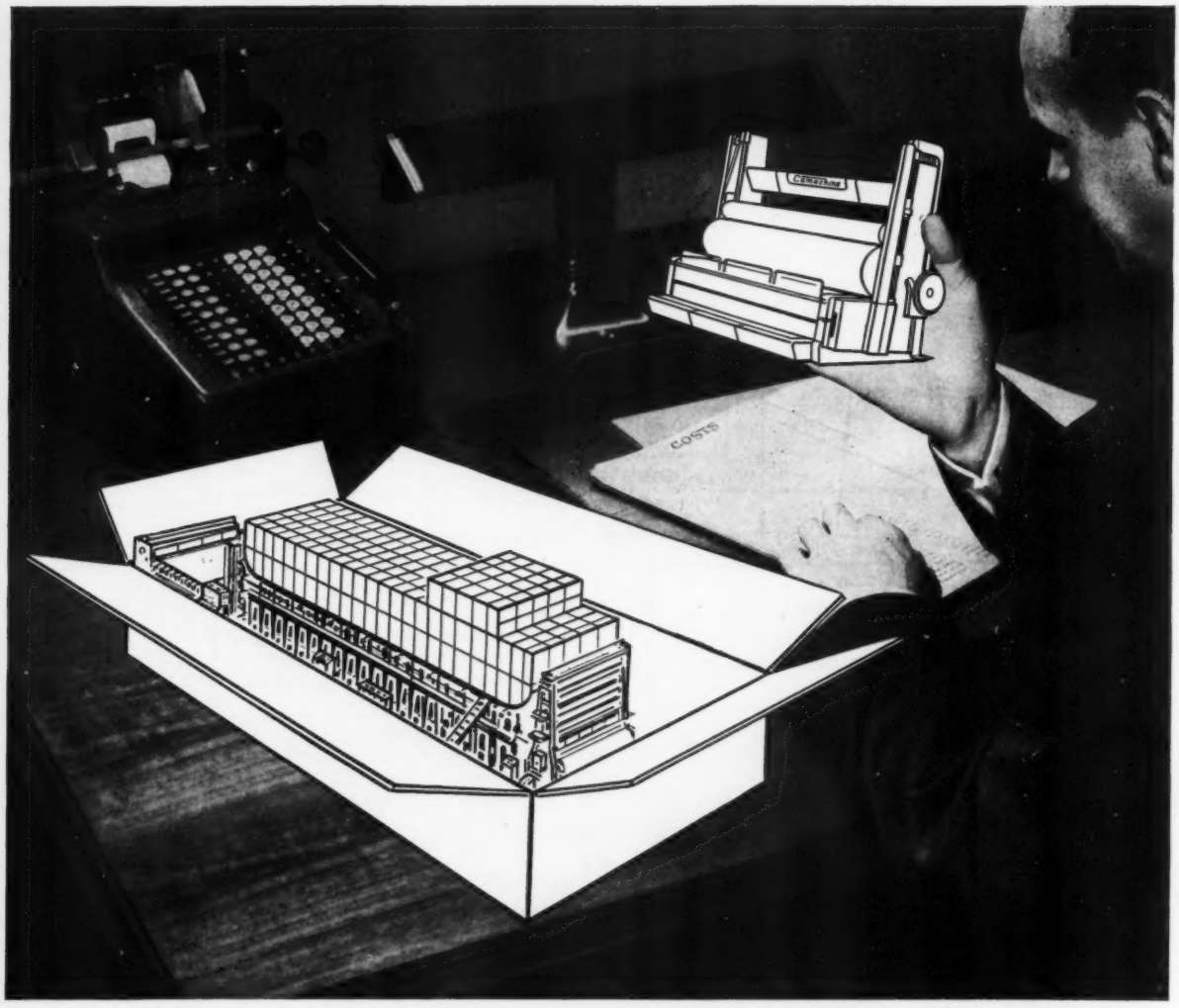
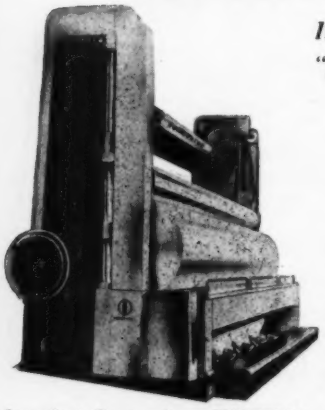


WHAT IS THE COST OF THE WINDER?



Investigate Cameron's new IMPERIAL *ultra modern, high-speed mill-type winders, featuring hydraulic controls.*

It is sometimes expedient to purchase a winder as part of an overall paper mill "package". Even so, there's no need to wind up with less than a Camachine . . .

Camachine winders may be purchased for use with any new or existing paper machine. Study Camachine's rugged, dependable design—compare production records — compare the fine quality of Camachine-made rolls — and you'll find that a Camachine *adds no extra cost* to the package!

Why are more than half of the mills in the United States and Canada equipped with Camachines for top-quality winding? One reason is found in the highly specialized skills of Cameron engineers and artisans. Here, the *undivided attention* of every man is concentrated *exclusively* on the single problem of better roll production equipment. Consider, too, the advantage of Cameron's background of half-a-century of specialized experience. No wonder modern Camachines are so far ahead in speed, dependability, economy and winding quality! You are invited to consult Camachine engineers regarding the right equipment to meet your requirements.

CAMERON MACHINE COMPANY • 61 POPLAR STREET • BROOKLYN 1, N. Y.

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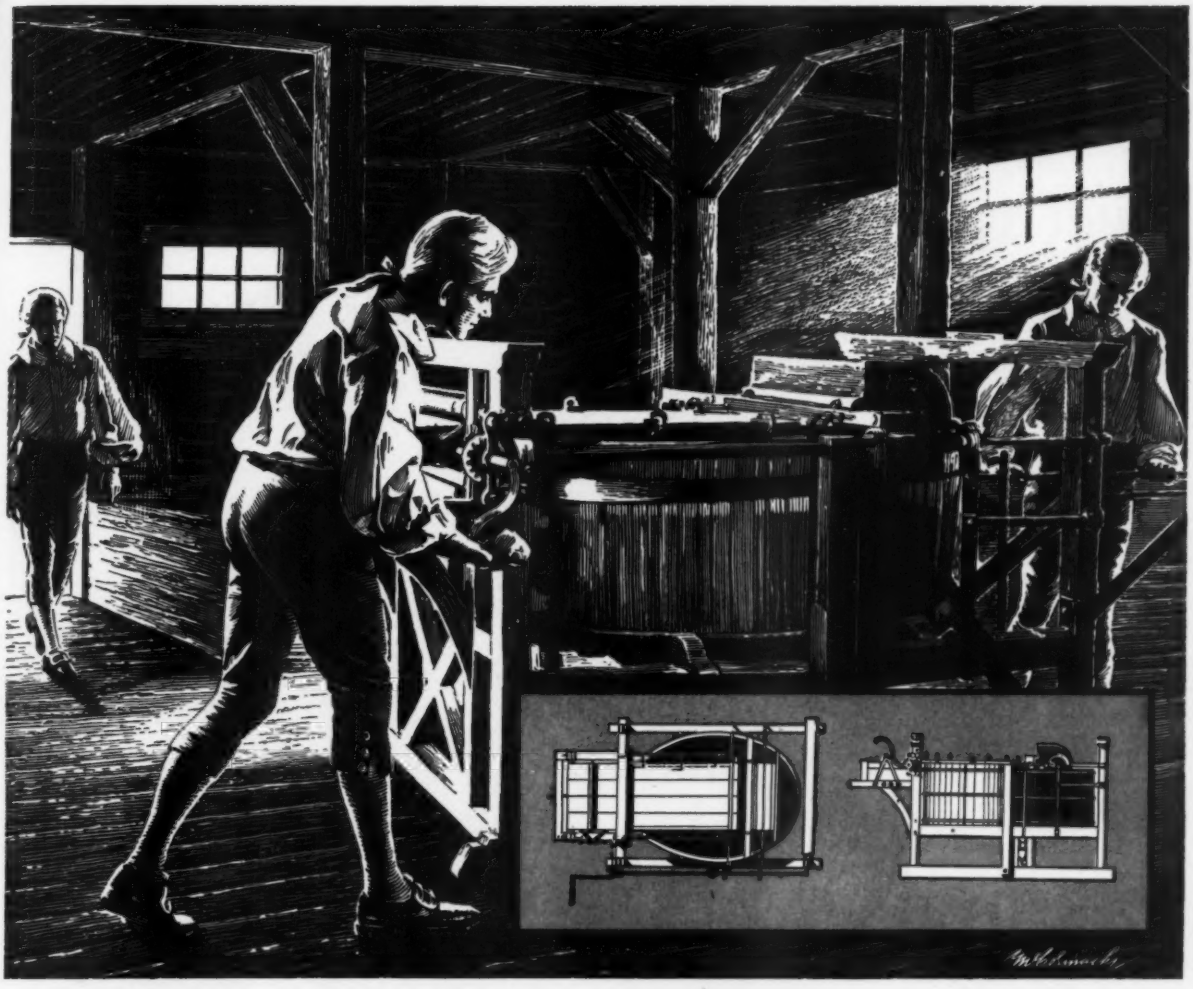

Papermaking Went Into High Gear With This Machine in 1798...

An important event in the history of papermaking was Nicholas-Louis Robert's invention of the paper machine over a century and a half ago. No longer would the slow methods of forming paper by hand limit size and quantity of paper sheets. Robert's machine formed paper of continuous length upon an endless woven-wire cloth which retained the matted fibers. Today more complex machines, operating on the same principle, produce a tremendous volume of paper. Helping maintain its quality are high-grade raw materials produced by A. E. Staley Manufacturing Company, supplier to leading mills for more than 30 years. Discover the many advantages Staley can offer *you*. See your supplier or write for details today.

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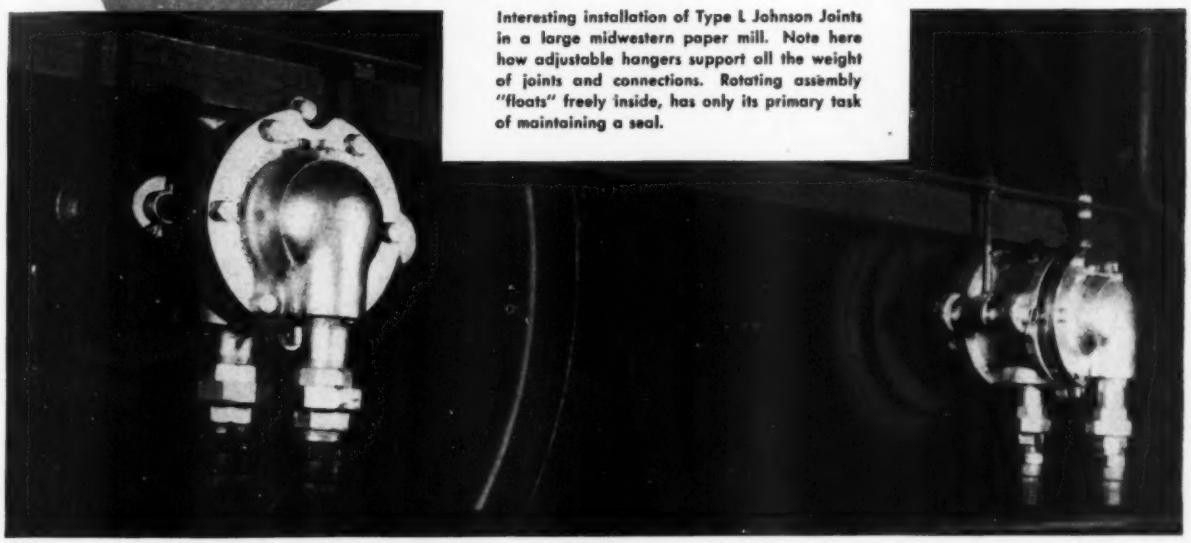
Floating Action makes the big difference in TYPE L JOHNSON ROTARY PRESSURE JOINTS



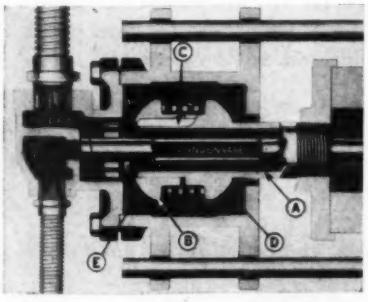
Interesting installation of Type L Johnson Joints in a large midwestern paper mill. Note here how adjustable hangers support all the weight of joints and connections. Rotating assembly "floats" freely inside, has only its primary task of maintaining a seal.

The success of the Type L Johnson Joint rests squarely on the fact that proper operation of any steam joint depends first on proper mounting.

In the Type L the weight of the joint proper and the connections is not imposed on the sealing mechanism. This load is carried by simple support rods which fit into lugs cast on the joint body.

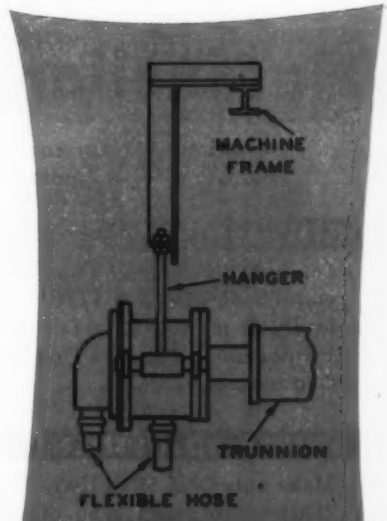
The rotating assembly literally "floats" within the housing—free to take full advantage of the lateral flexibility provided in Johnson Joints. Since these internal wearing parts have only their primary task of maintaining the seal, longer life and more trouble-free service can be expected.

Type L Johnson Joints are available for use with stationary or rotating syphon pipes; write for complete information.



Packless, Self-Lubricating, Self-Adjusting, Self-Aligning

Nipple (A) is connected to roll. Collar (B) is keyed to nipple at (C), but fits loosely so pressure can fill entire housing. Pressure is sealing force, consequently self-adjusting. Seal ring (D) and bearing ring (E) are of special carbon-graphite; they eliminate packing or need for lubrication. Note room for lateral movement of rotating assembly, spherical seating for angular movement.



Details of Type L installation similar to that shown in photo.

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Direct Operated Solenoid Valves • "Instant" Steam Water Heaters

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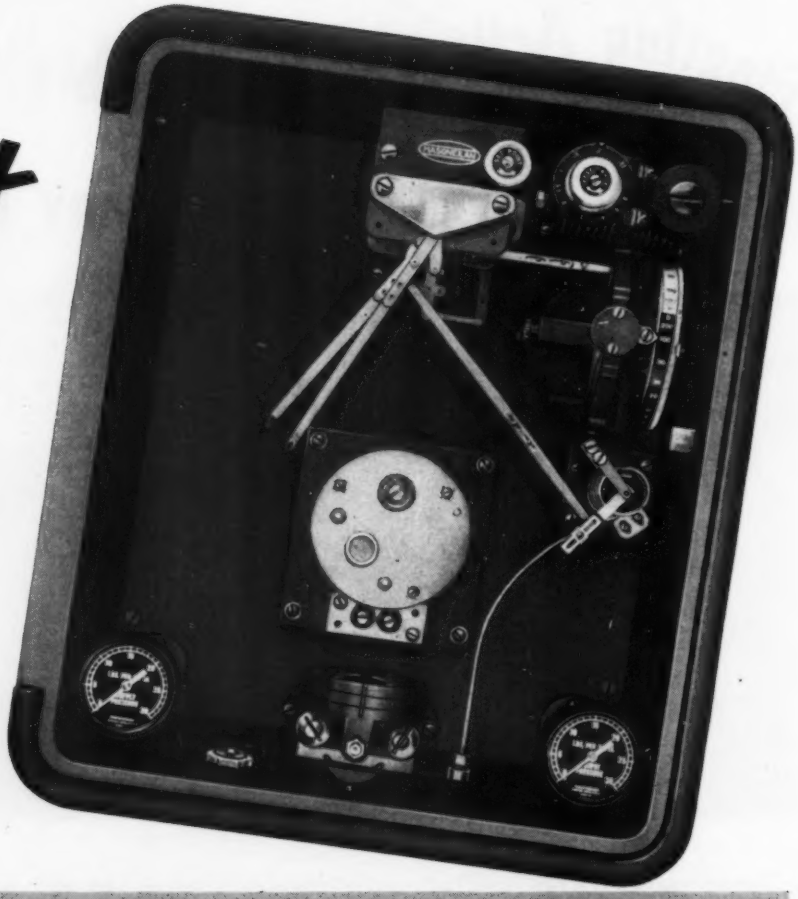

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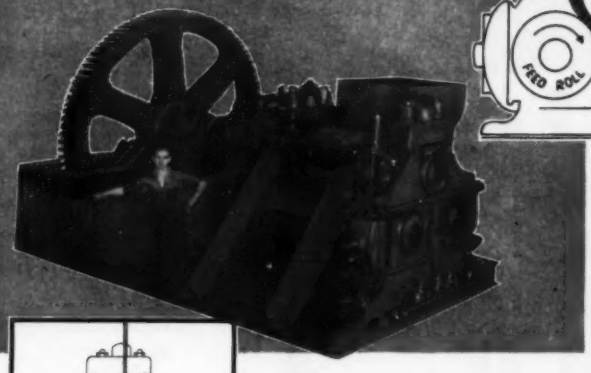

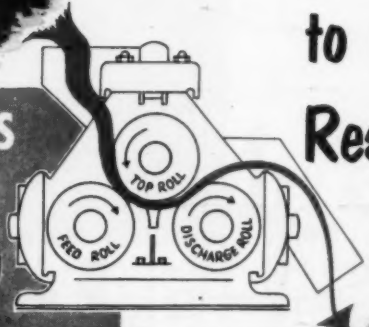

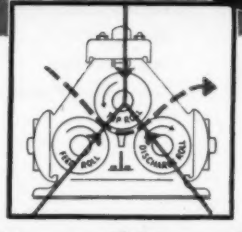

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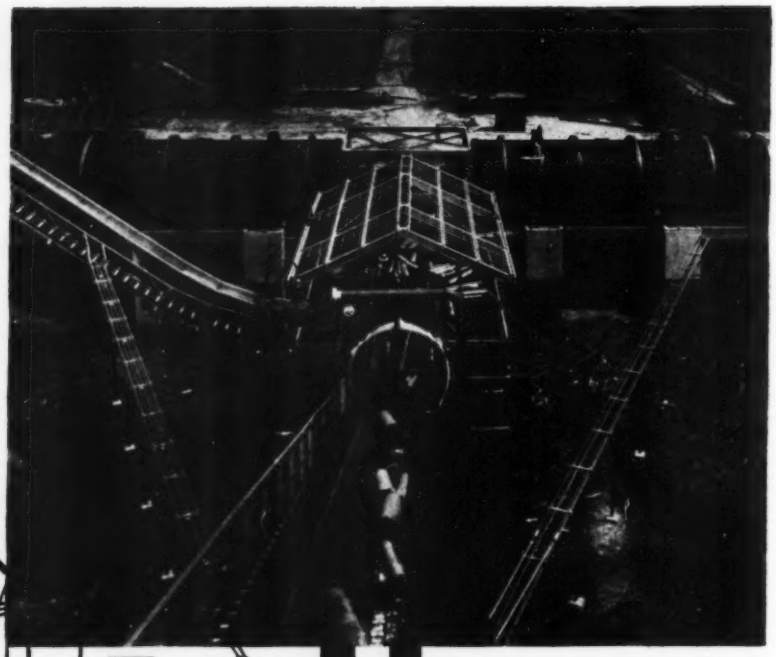

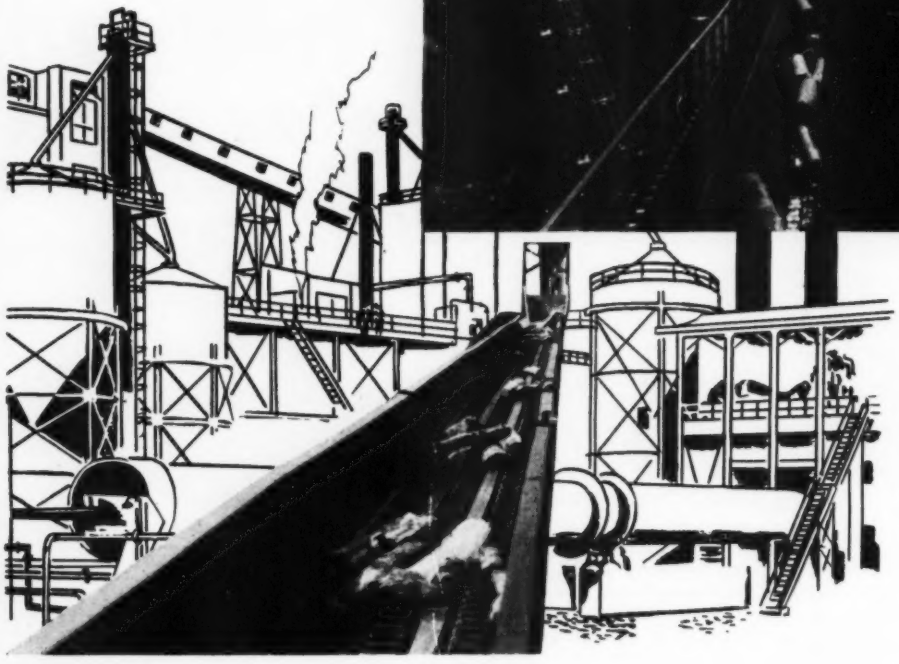

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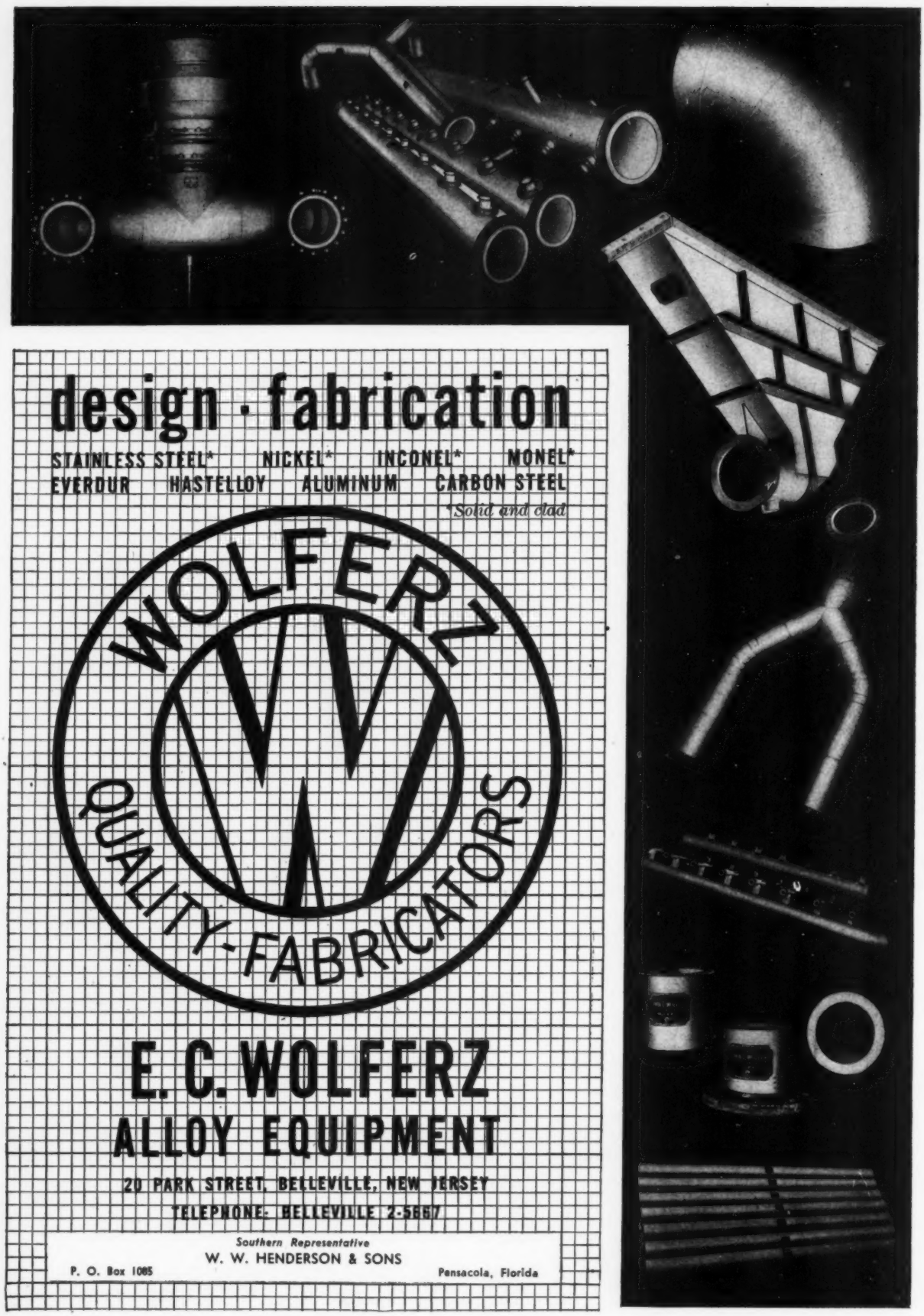

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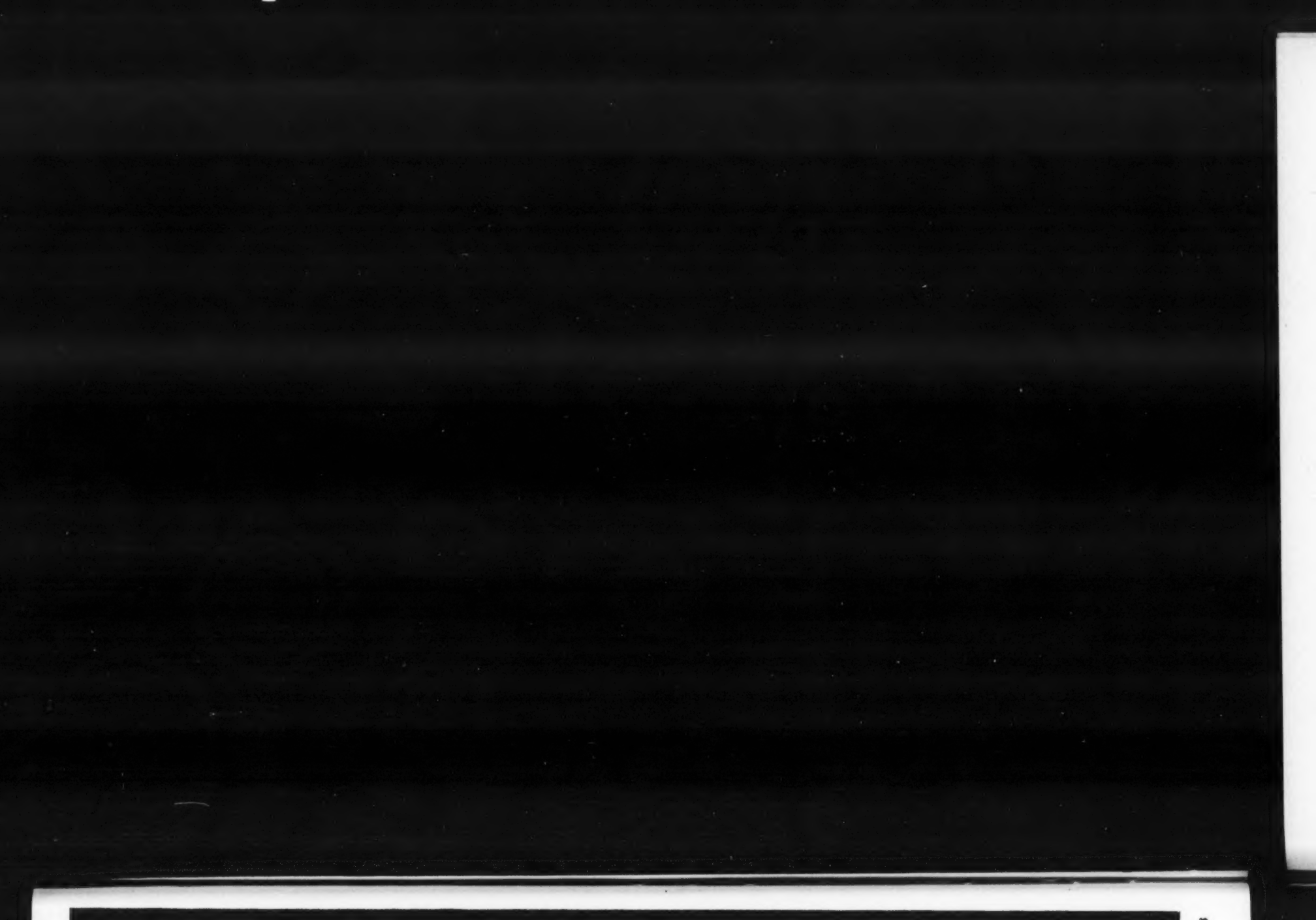

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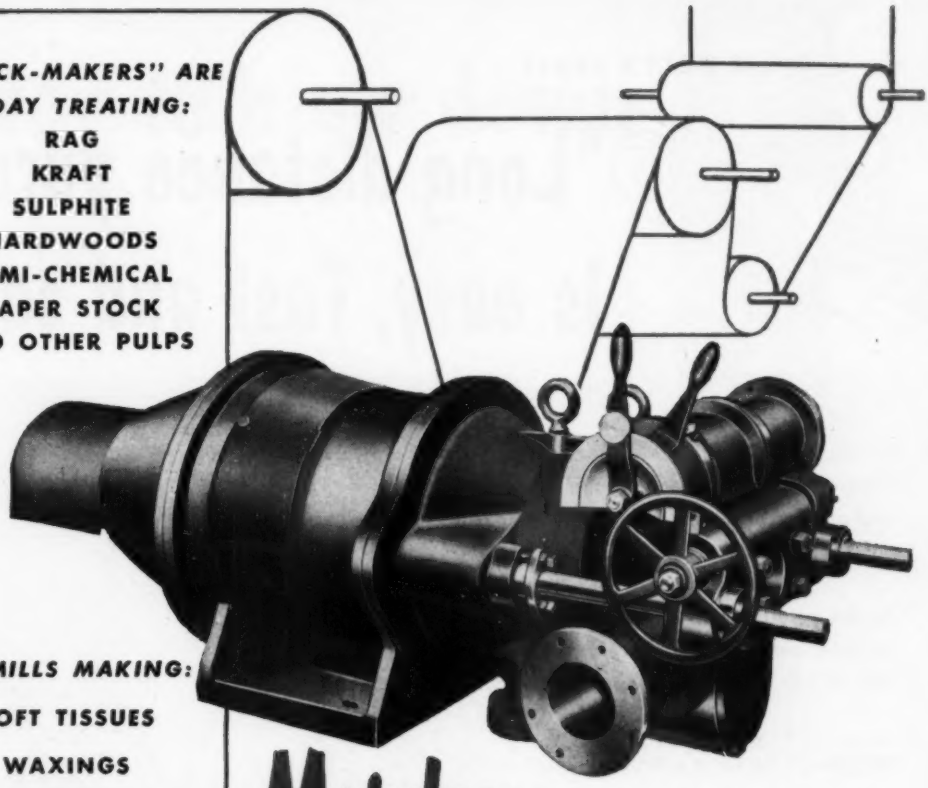
PAPER STOCK
AND OTHER PULPS



IN MILLS MAKING:

SOFT TISSUES
WAXINGS
BOOK
BONDS
BOARDS
WRITINGS
WRAPPINGS
BAG
COATED
CARBONIZING
GLASSINE
AND OTHER GRADES

Morden "STOCK-MAKER" BEATS THEM ALL CONTINUOUSLY...

Direct from chest to chest or from chest to paper machine without batching or cycling.

The "Stock-Maker" gives the utmost efficiency in beating treatment — at one-half the power, in one-third the space, with none of the labor required by the ordinary conventional roll type beater.

The 700 "Stock-Maker" installations in 180 paper mills in 23 countries throughout the world prove that—

For quality and economy, it will pay you well to Mordenize your beating with "Stock-Makers".

MORDEN
STOCK PREPARATION EQUIPMENT
MACHINES COMPANY

For complete information write
MORDEN MACHINES COMPANY
Corbett Building, Portland, Oregon

HAM FELTZ says:

"Long distance purchasing is easy, fast and safe..."

In this "land of brands" you can test and compare values of competitive offerings in almost every department—automobiles, food, clothing and appliances of all descriptions. After a few tests you usually find one particular brand in each department that you prefer over all others.

As the result of this kind of testing, many superintendents of paper and board mills prefer Hamilton Felts to any other make of papermakers' felts.

Whether it be for a cylinder machine or for a fourdrinier, you can order a Hamilton Felt "same as last order" by mail, telephone or telegraph, and you will receive what you order.

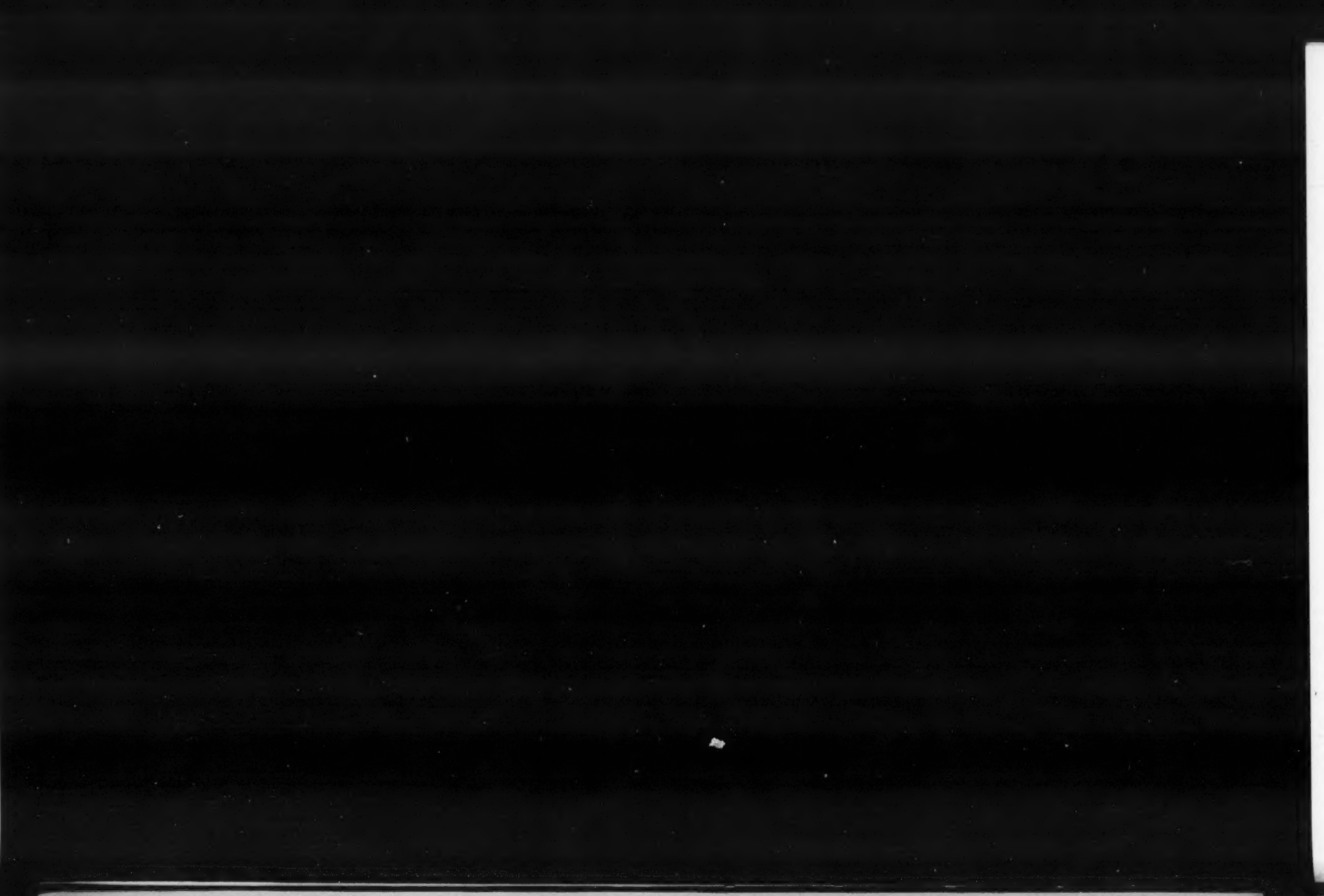
As a matter of fact, most millmen do order in that way.

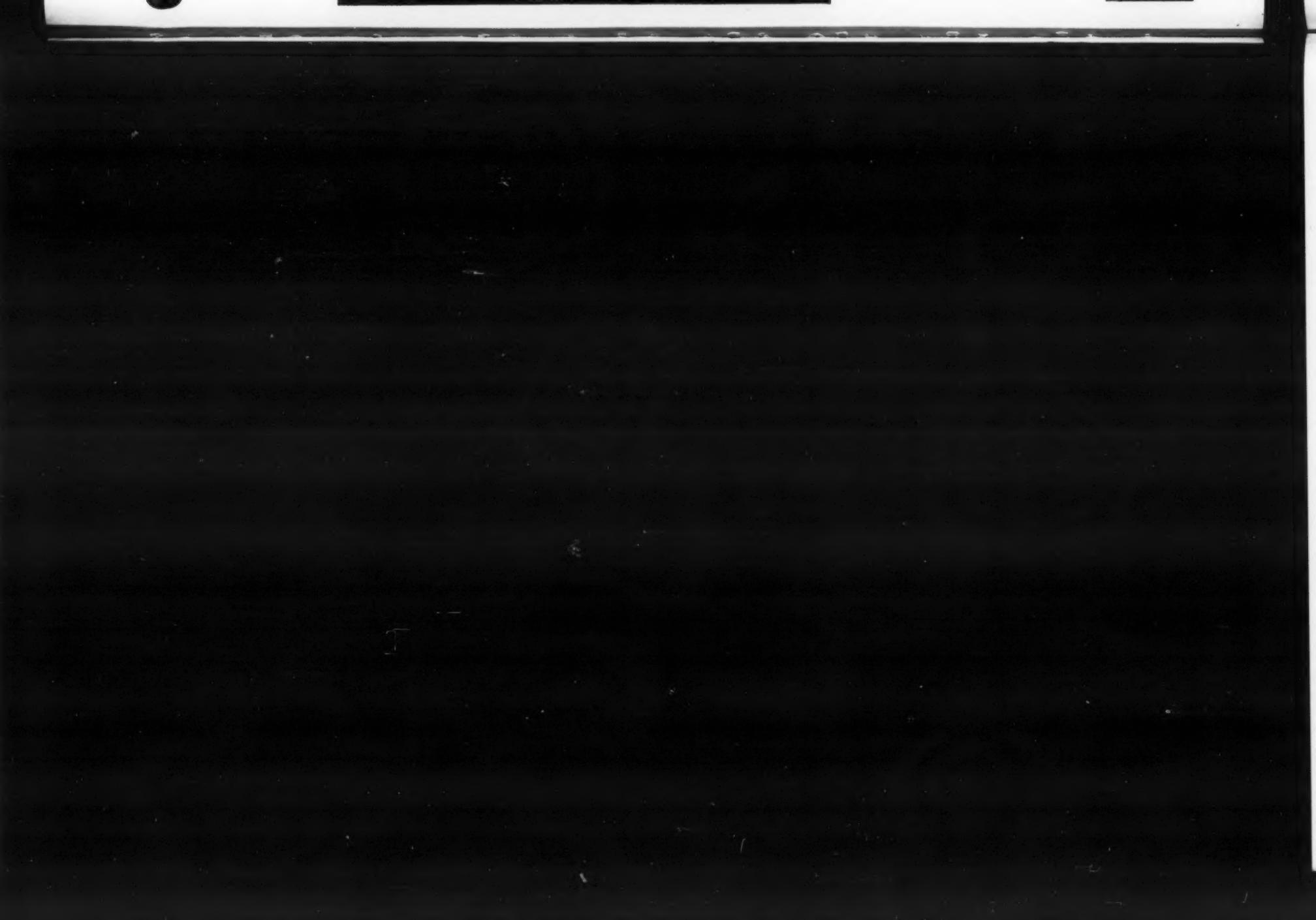
Hamilton Felts

MIAMI WOOLEN MILLS

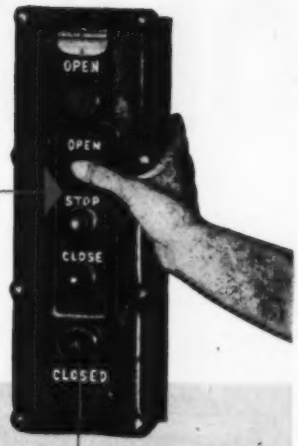
Established 1858

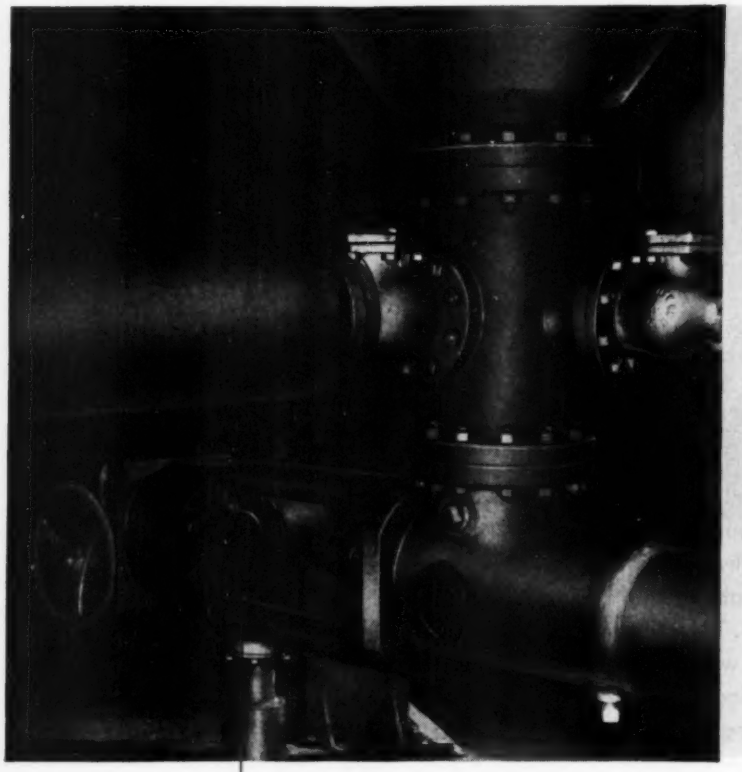
SHULER & BENNINGHOFEN, HAMILTON, OHIO





easy way to blow down pulp digesters





Press a button. ***That's all there is to it.***

You don't even have to go down to the discharge floor; the button can be conveniently located right on the operating level.

That's one of several reasons why Yarway Remote-Controlled, Motor-Operated, Digester Blow Valves have become standard equipment on pulp digesters in many leading plants—*names on request.*

One of eight Yarway Digester Blow Valves installed at a Canadian paper mill.

OTHER REASONS:

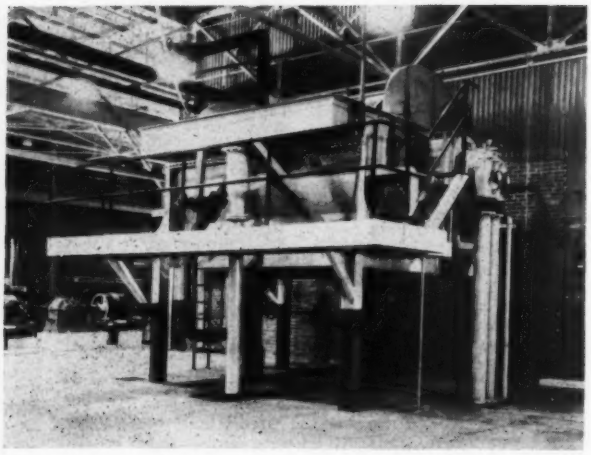
1. **The famous Yarway non-clog *seatless* operating principle that assures tightness and effectively seals off the digester, preventing loss of black liquor and increasing the number of cooks per day.**
2. **Yarway's rugged construction withstands severe shock.**
3. **Yarway's modern metallurgy withstands severe chemical action.**
4. **Fast operation results from motor control and self-cleaning free discharge.**

If you are interested in increased production, low maintenance, savings in labor—then you're interested in Yarway Digester Blow Valves. Write for full description and specifications in Yarway Bulletin B-440.

YARNALL-WARING COMPANY
149 Mermaid Ave., Phila. 18, Pa. • Branch offices in Principal Cities

YARWAY

OLIVER SAVEALL



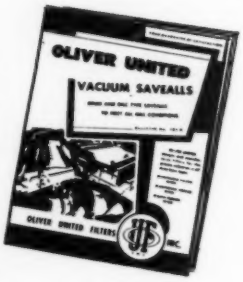
*Photograph courtesy
Certain-teed Products Corporation

Key Equipment In
CERTAIN-TEED'S
New Paper Mill
Pryor, Oklahoma

...where prevention of fiber loss is a MUST

As a matter of fact, isn't it pretty nearly a must in every mill?

Oliver United, with its two unit selection, is the logical place to come for your Saveall requirements. One unit is the Oliver Drum Type Saveall, such as illustrated above and already in use in hundreds of mills. The other is the American Disc Type Saveall which provides special design and operating advantages, particularly in the handling of slow stocks such as tissues, book papers, highly refined pulps, carbon papers, glassine and light kraft. The American provides exceptionally large capacity for a single unit and because of this, is ideal for very large paper machines and certain high speed machines where excessive volumes of white water are involved. Several mills with special problems are now using it. Both Olivers and Americans are described fully in our Bulletin 701-R.



Yes, Oliver United is in position to give you *seasoned experience* in connection with fiber recovery problems and offers a choice of two well-proved Savealls — the Oliver and the American.

NEW YORK 36 — 33 West 42nd Street • CHICAGO 1 — 221 North LaSalle Street
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Export Sales Office — New York • Cable — OLIUNIFILT

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Something New in Sizing

KELGIN XL, a new development in paper surface sizing, can be applied on either the calender stack or size press as a 0.75% - 3.5% solution. It effectively increases surface density, develops finish and improves smoothness. High gloss mottle-free printing at substantially reduced ink costs. KELGIN XL sizing effectively increases grease resistance of paperboard and glassine stock.

If you have sizing problems in one of these applications, ask your nearest Kelco office to send a Kelco technical paper representative to demonstrate the advantages of KELGIN XL.

KELGIN XL . . . a product of KELCO company

31 Nassau Street, New York 5, N.Y.
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530 W. Sixth Street, Los Angeles 14, Calif.
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LODDING

Precision Built

DOCTOR BLADES

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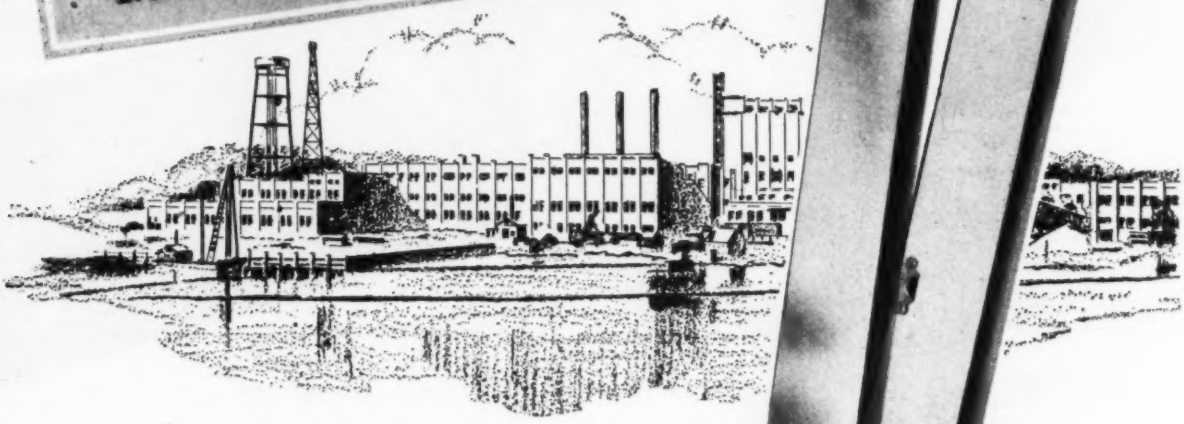
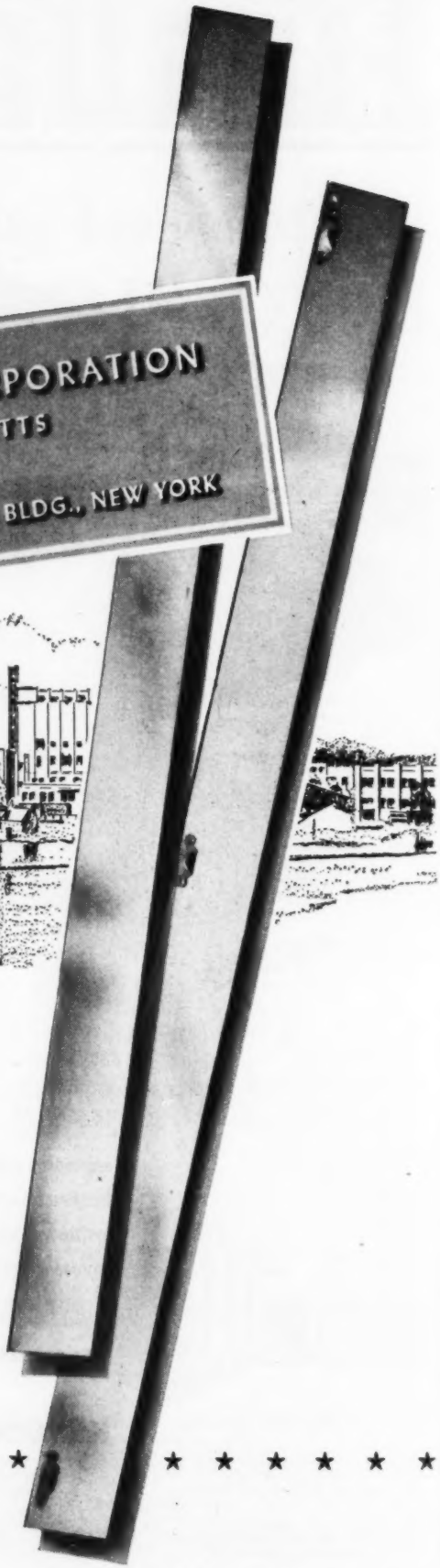


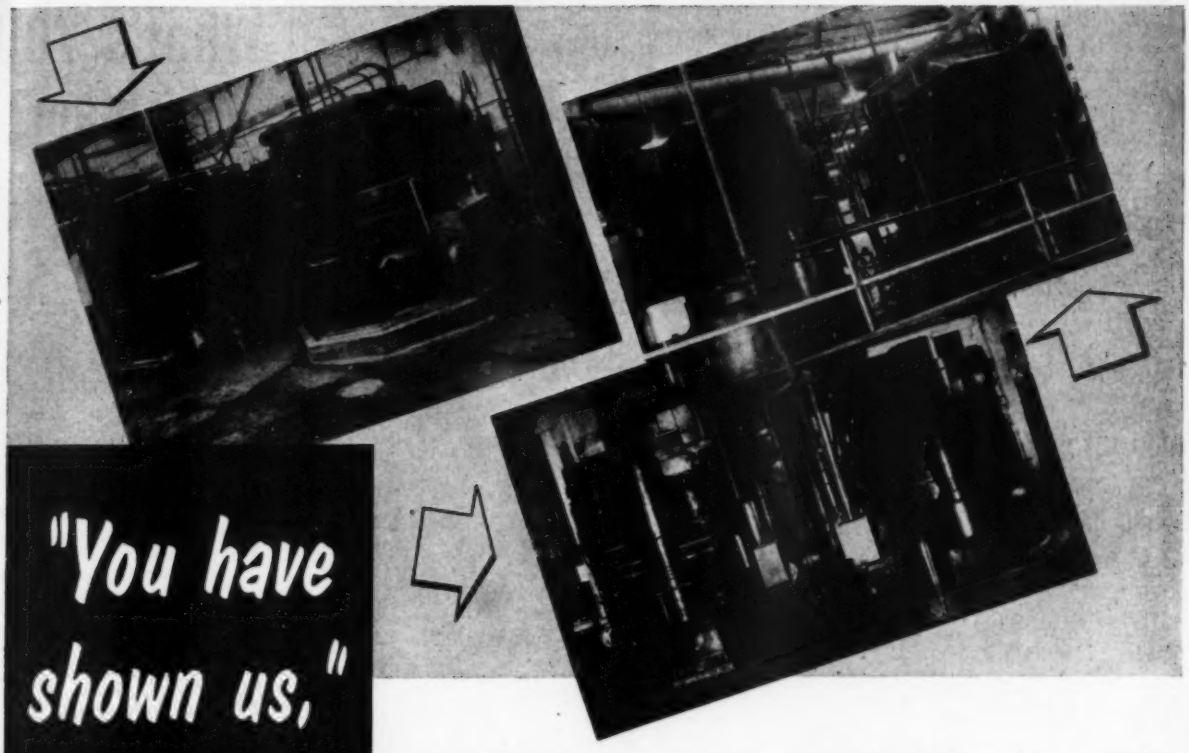


Available in:

- **K Monel**
- **Alloy Steels**
- **Stainless Steel**
- **Phosphor Bronze**
- **Laminated Plastics**
- **Abrasive**

Ask your Lodding Representatives about our blade survey service

★ ★



"You have shown us,"

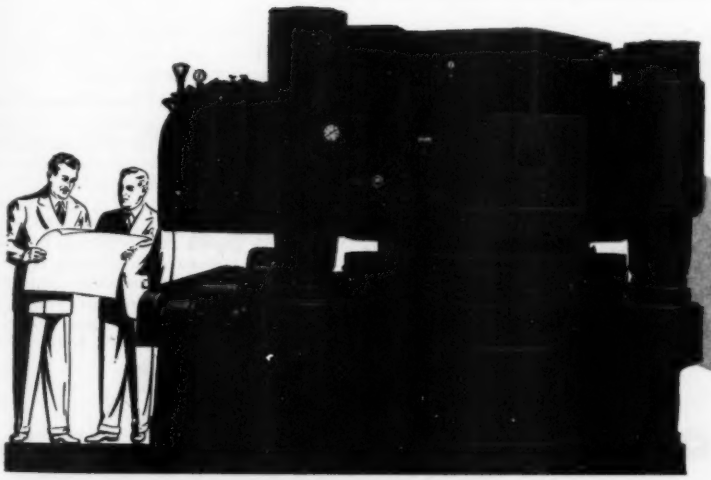
MILL MANAGEMENT SAID

Naturally, mill management men wanted proof that the Curlator would do the things we claim. They had to have proof—and rightly so—that Curlators

- would make substantial savings, up to 10% of their wood, as well as coal, sulphur and limestone . . .
- would upgrade No. 2 sulphite and fine screen rejects to No. 1 sulphite.
- would impart more desirable properties to their finished paper . . .
- would give continuous trouble-free operation . .
- would pay for itself in a reasonable length of time.

Yes, mill management said, "You had to show us before we bought two, three or four Curlators." What happened? The first Curlators proved themselves so well that management in a number of mills, like the three pictured above, purchased additional machines to increase their curlated pulp tonnage.

Let us prove to you what Curlators can do for you . . . how the Curlator will pay for itself.

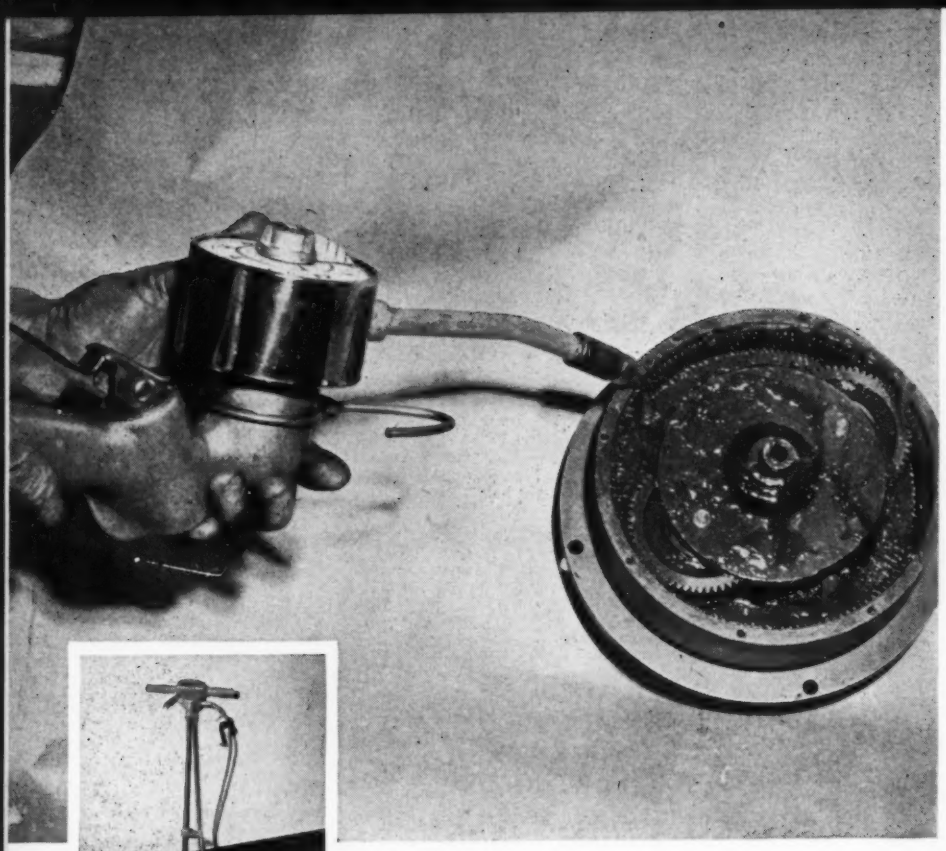


WRITE today for detailed information.

Canadian Representative—
Homad Services, Ltd., Montreal

CURLATOR†
Corporation
EAST ROCHESTER, NEW YORK

†T. M. Reg.—Curlator Corporation, Rochester, N. Y.



Solves leakage problem . . .

● Multi-clean Products, Inc., St. Paul, Minnesota, manufactures industrial floor polishing and scrubbing machines. The machines are shipped with grease already installed in gear reduction units. The problem faced by this company was one of finding a grease that would stand up under hard service and not leak from the gear units. Greases tried either caused or threatened leakage troubles.

Called in on this problem, a Standard Oil lubrication specialist recommended STANOBAR Grease "S", a highly stable grease with a unique adhesive characteristic. Given an accelerated service test, STANOBAR did not leak from the gear unit, and its consistency showed no change that would later cause a leakage problem. There was no wear of gears or bearings. Adopted for use in the units, STANOBAR has solved this company's lubrication problem on every count. Officials have been able to eliminate the costly and troublesome practice of having all units returned to the factory, at 12 months intervals, to be repacked with grease.

STANOBAR
TRADE MARK
Grease

The same lubricating qualities of STANOBAR that solved this problem for Multi-clean Products, Inc. can serve you in a wide variety of applications. A Standard Oil lubrication specialist will be glad to discuss those applications with you. He's right there in your section of the Midwest. You need only phone your local Standard Oil office. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

C. L. Daub is the Standard Oil lubrication specialist who helped Multi-clean Products, Inc. solve an important lubrication problem through his recommendation of STANOBAR Grease.

Like all Standard Oil lubrication specialists, he has a broad background of practical experience plus thorough training in Standard's own schools. And like all lubrication specialists, his on-the-job assistance is always available to the industries in the immediate area he serves. He is one of a corps of experienced men who make their headquarters wherever industry is located throughout the Midwest. Call for the services of your Standard Oil lubrication specialist today. When he stops at your plant, be sure to get information on these outstanding products:

STANOIL Industrial Oils—This multi-purpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems. One of two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants—On open gears and wire rope, these greases resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANORUST Rust Preventives—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specially developed for its intended use. The grades range from a fingerprint remover to a heavy semi-solid that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY

STANDARD *(Indiana)*

National Basic Dyes recommended for Colored Groundwood Specialties

NATIONAL AURAMINE OP CONC.

NATIONAL CHRYSOIDINE YP CONC. NEW

NATIONAL CHRYSOIDINE RP CONC.

NATIONAL BISMARCK BROWN RP CONC.

NATIONAL SAFRANINE AP CONC.

NATIONAL RHODAMINE BP EXTRA

NATIONAL FUCHSINE SBP

NATIONAL METHYL VIOLET 2BP CONC.

NATIONAL CRYSTAL VIOLET 6BP CONC.

NATIONAL VICTORIA PURE BLUE BOP

NATIONAL VICTORIA BLUE BP CONC.

NATIONAL METHYLENE BLUE 2BP

NATIONAL VICTORIA GREEN WBP CRYSTALS

NATIONAL BRILLIANT GREEN BP CRYSTALS

For deep-colored groundwood papers you can get excellent results at low cost with combinations of National Basic Dyes listed here. These colors have a natural affinity for unbleached sulfite and groundwood fibers and produce their bright, attractive colors at the lowest possible coloring cost.

Our Color Service Laboratories will be pleased to develop formulations to match shades you require and to assist on any paper-color problem. Your inquiry will have prompt and intelligent attention.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

BOSTON PROVIDENCE PHILADELPHIA CHICAGO SAN FRANCISCO
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Allied Chemical

How Layne assures your water supply

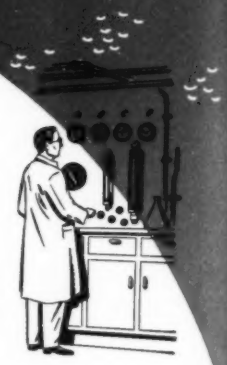
UNDIVIDED LAYNE RESPONSIBILITY MEANS COMPLETE SERVICE, LOWER COSTS

Layne surveys and test wells

Layne's *complete* service begins long before the wells are drilled . . . with geological surveys made in cooperation with engineers of the client company or municipality. Test-hole drilling shows actual conditions.

Layne analyses and recommendations

Samples taken from the test holes go to Layne's central laboratories, where technicians report on the earth structure and qualities of the water. From these reports, water-system recommendations are made.

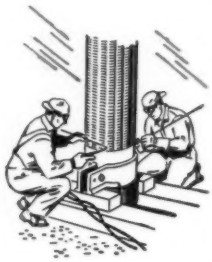


Layne-engineered pumps, screens, casings

Into every Layne well goes equipment designed for the specific job—the finest equipment, produced with the greatest economy, because of Layne's thorough engineering skill and world-wide experience.

Layne installation and maintenance service

Skilled Layne workmen handle every stage of the job—assuring a system custom-engineered for your own situation. And Layne's experience is always at your service for any maintenance work you may need.



Let Layne help you plan ahead on your water needs

Layne welcomes the opportunity to share in long-range planning for your water-supply needs. For information on any phase of well water supply or pump equipment, contact your nearest Layne Associate Company or write Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

WATER WELLS • VERTICAL TURBINE PUMPS
WATER TREATMENT

Layne Associate Companies Throughout the World

Lasting Crowns—More use per Dollar

MANHATTAN RUBBER COVERED ROLLS

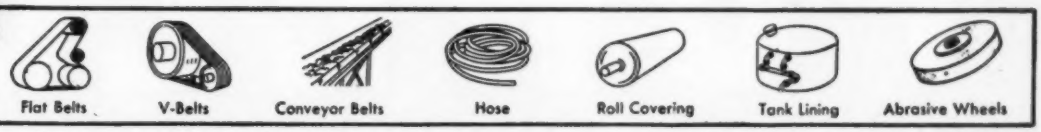
• OUR NEW NEENAH, WIS. PLANT IS DESIGNED FROM THE GROUND UP TO HANDLE ANY SIZE ROLL COVERING MOST EFFICIENTLY.

You save money on rolls and lower your production costs because you get perfect and durable crowns to *your* specifications . . . Just the right density . . . Just the precise dimensions you demand. That's because Raybestos-Manhattan custom-covers roll cores to meet the special needs of your plant. Manhattan Rubber Covered Rolls hold their crowns longer and their density permanently, giving you uniform, trouble-free production. Talk it over with the R/M specialist nearest you, next time you need rolls rubber covered.

ROLL COVERING PLANTS AT PASSAIC, N. J. — NEENAH, WISC. — NORTH CHARLESTON, S. C.

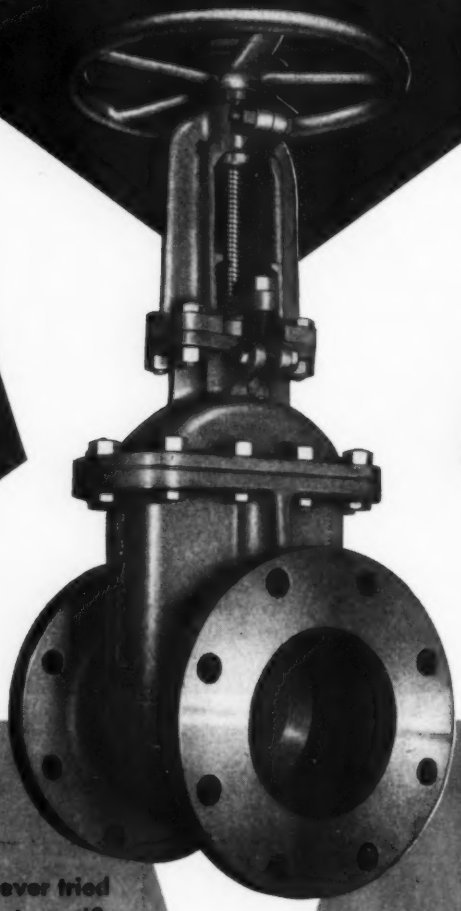
MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

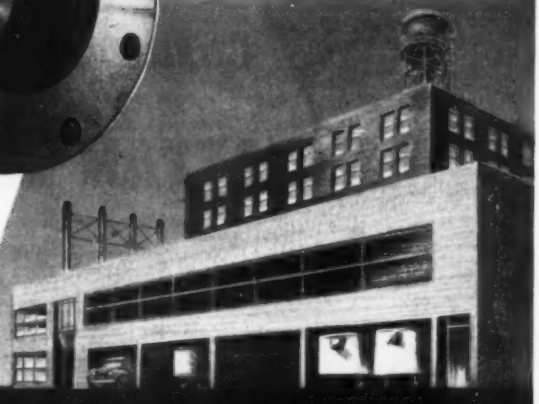
To know how good valves can be, install valves that are known to be good



DEPENDABLE VALVES SINCE 1846

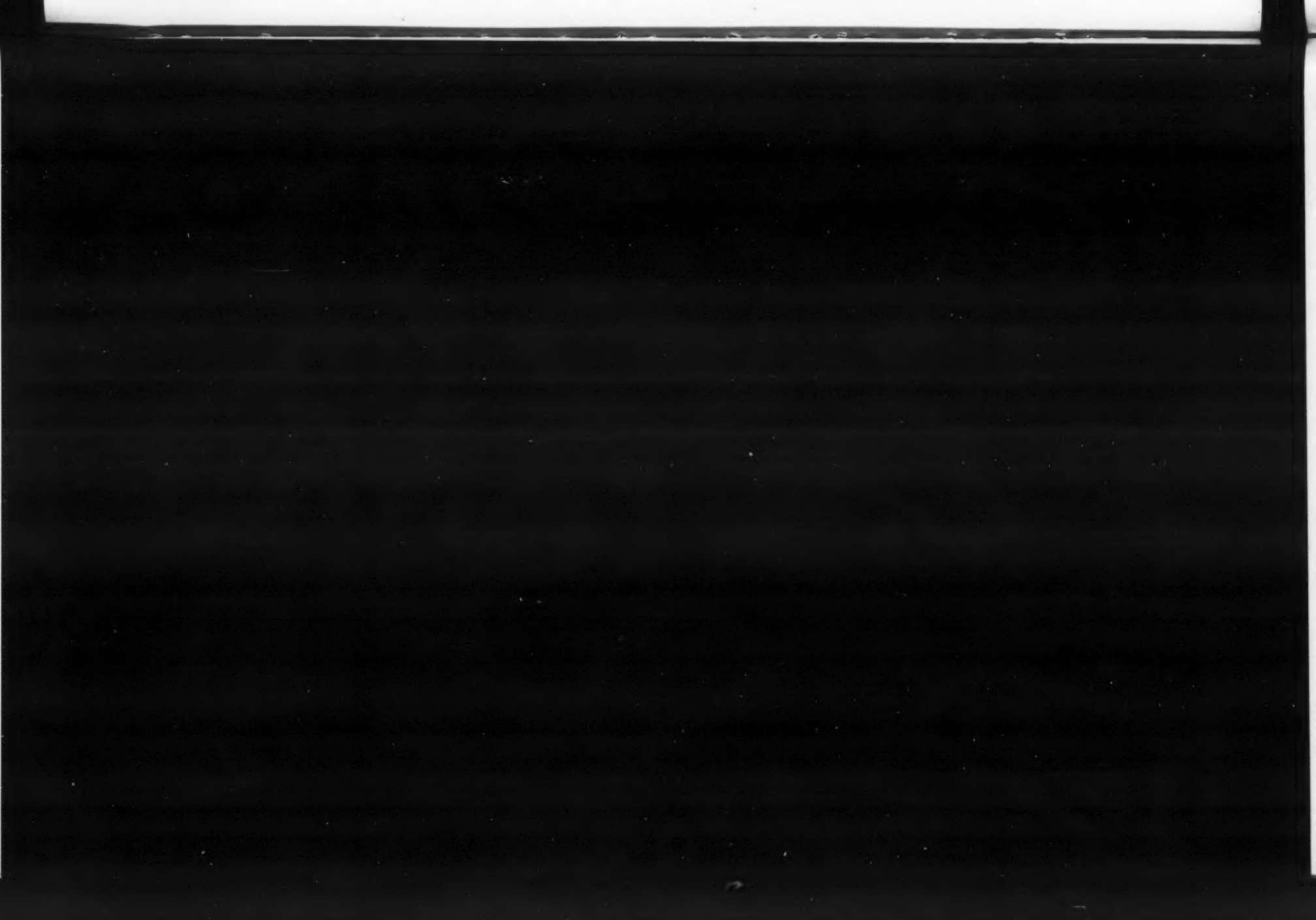
If you already have Powell Valves in your lines, you are enjoying flow control at its best. But possibly you have never tried valves engineered to meet specific service conditions under which they must operate. To find out how good valves really can be, install Powell.

The Wm. Powell Company
Cincinnati 22, Ohio



POWELL

BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES



There's a *simple* way to solve what appears to be a complex speed reduction problem

Get the proper drive combination that best meets your requirements from the broad LINK-BELT line

YOU'LL find your power transmission costs are lowered several ways when you use Link-Belt enclosed gear drives. First, Link-Belt offers a broad range of types and sizes in helical, herringbone and worm gear designs. You get the *one* reducer best suited to your needs.

In addition, Link-Belt builds a complete line of power transmission machinery. Installation and alignment are simplified because dimensions of Link-Belt chains and sprockets, bearings and couplings are all coordinated. And there's no need to call in another firm for any information or assistance.

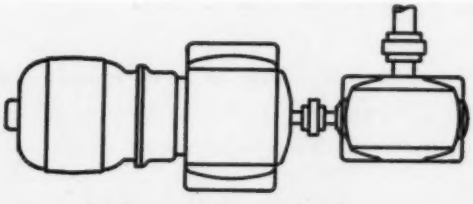
This overall integration—plus the long life built into every piece of Link-Belt equipment—guarantees optimum efficiency. Result: lower power consumption and maintenance costs.

Make the nearby Link-Belt sales office or distributor your power transmission headquarters. Nowhere else can you get the great selectivity that assures you of the best in enclosed gear drive applications.

LINK-BELT

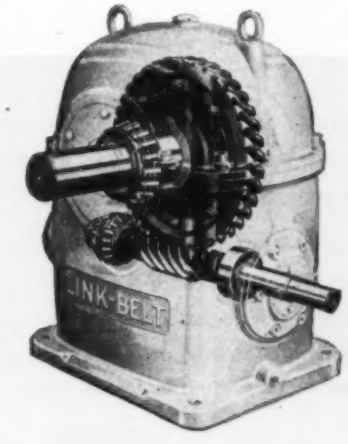
ENCLOSED GEAR DRIVES 13,127

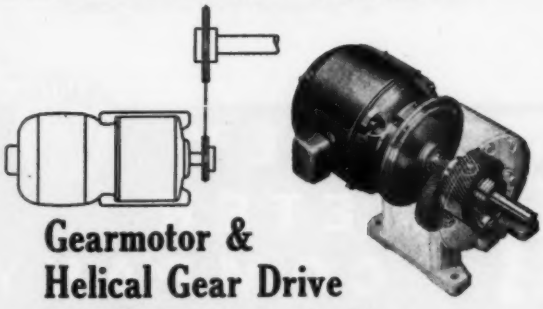
LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.



Worm Gear Drive

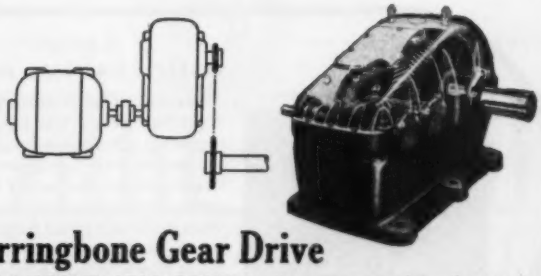
WORM GEAR and P.I.V. variable speed drives are shown direct-coupled. Link-Belt worm gear drives are available in 3.1:1 to 8000:1 reduction ratios—1400 to 123,000 in. lbs. torque—0.22 to 564 output shaft rpm. Ask for Book 2324A.





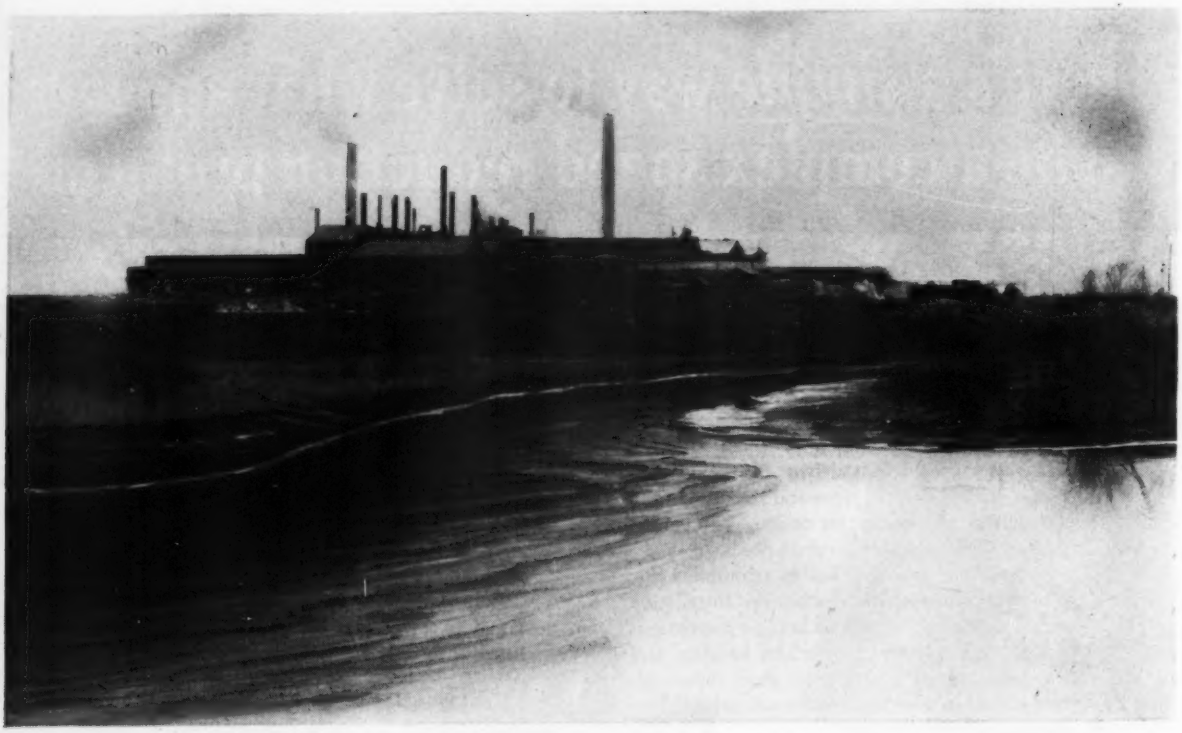
Gearmotor & Helical Gear Drive

GEARMOTOR is shown with roller chain drive. Link-Belt Helical Gear Drives, Gearmotors and Motogears are available in 6.2:1 to 292:1 reduction ratios—1 to 30 hp—6 to 280 output shaft rpm. Ask for Books 2247 and 2451.



Herringbone Gear Drive

HERRINGBONE GEAR DRIVE is shown connected by flexible coupling to motor and with roller chain takeoff. Link-Belt Herringbone Gear Drives are available in 2.84:1 to 326:1 ratios—0.4 to 2480 hp—2.2 to 623 output shaft rpm. Ask for Book 2519.



WORRIED ABOUT WASTE DISPOSAL?

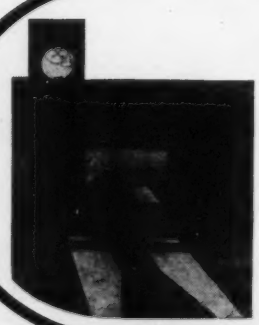
Bailey Meters Help you to Reduce Pollution

● The disposal of industrial wastes without stream pollution calls for careful planning and continuous vigilance.

That's where Bailey Meters and Controls come in. We measure the flow and pH of sewage, sludge, and industrial wastes flowing in open channels or pipe lines. These and other factors, such as levels, rates of chemical feed, and flow of air, may be co-ordinated into a completely automatic system for the treatment and disposal of waste materials.

When you want fast, complete and authoritative answers to the measurement and control aspects of your waste disposal problems, reach for your phone and call your local Bailey Engineer. Offices in all principal industrial centers.

P-24



BAILEY
OPEN CHANNEL METERS

These indicating, recording and integrating meters are suitable for measuring industrial wastes, sewage, sludge, corrosive liquids, and irrigation water flowing in all types of open channel primary metering devices, such as Venturi flumes, weirs, or nozzle flumes. Electric or pneumatic telemetering permits location of receivers wherever desired. Ratio of flows and chemical feeds may be controlled automatically.

BAILEY METERS

BAILEY METER COMPANY

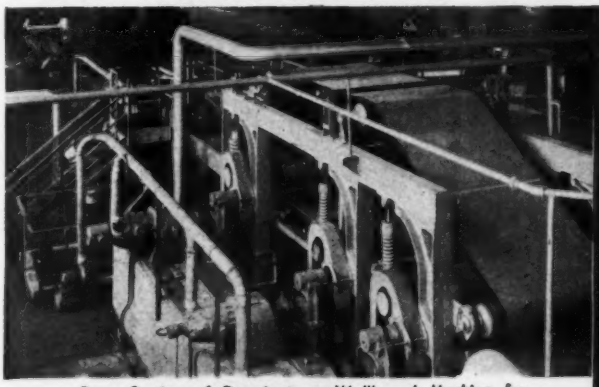
1058 IVANHOE ROAD
CLEVELAND 10, OHIO

Process Controls
TEMPERATURE · FLOW
PRESSURE · LEVEL
GAS ANALYSIS · RATIO

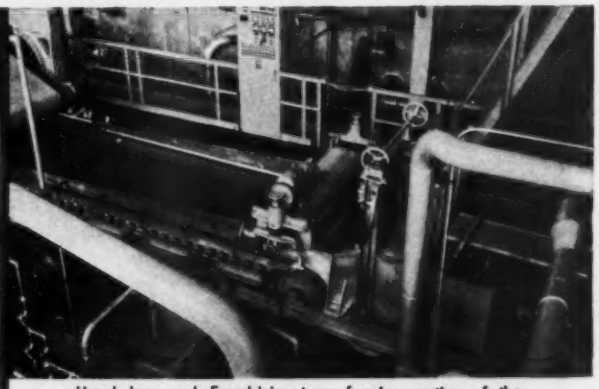
THE KEY THAT ELIMINATES "WASTE" OF BY-PRODUCTS OF LUMBER PRODUCTION

Downingtown Wallboard Machines

FOR HARDBOARD AND INSULATING BOARD



Press Section of Downingtown Wallboard Machine for making hardboard at Oregon Lumber Co.



Head box and Fourdrinier type forming section of the machine shown at left.

Cantilevered press section of a new wallboard machine making either hard or insulating board.

Pneumatic cylinder loaded press section of a Downingtown Wallboard Machine showing two suction press rolls.

A number of new processes have been recently developed which utilize what were formerly "waste" wood products in the production of valuable hardboard and insulating board for the building industry.

An important part of the process is performed by Downingtown Wallboard Machines, consisting of a forming and press section, continuously producing a wet mat to close tolerances.

Be sure to consult a Downingtown Sales Engineer about wallboard production. Or write for Bulletin No. 549.

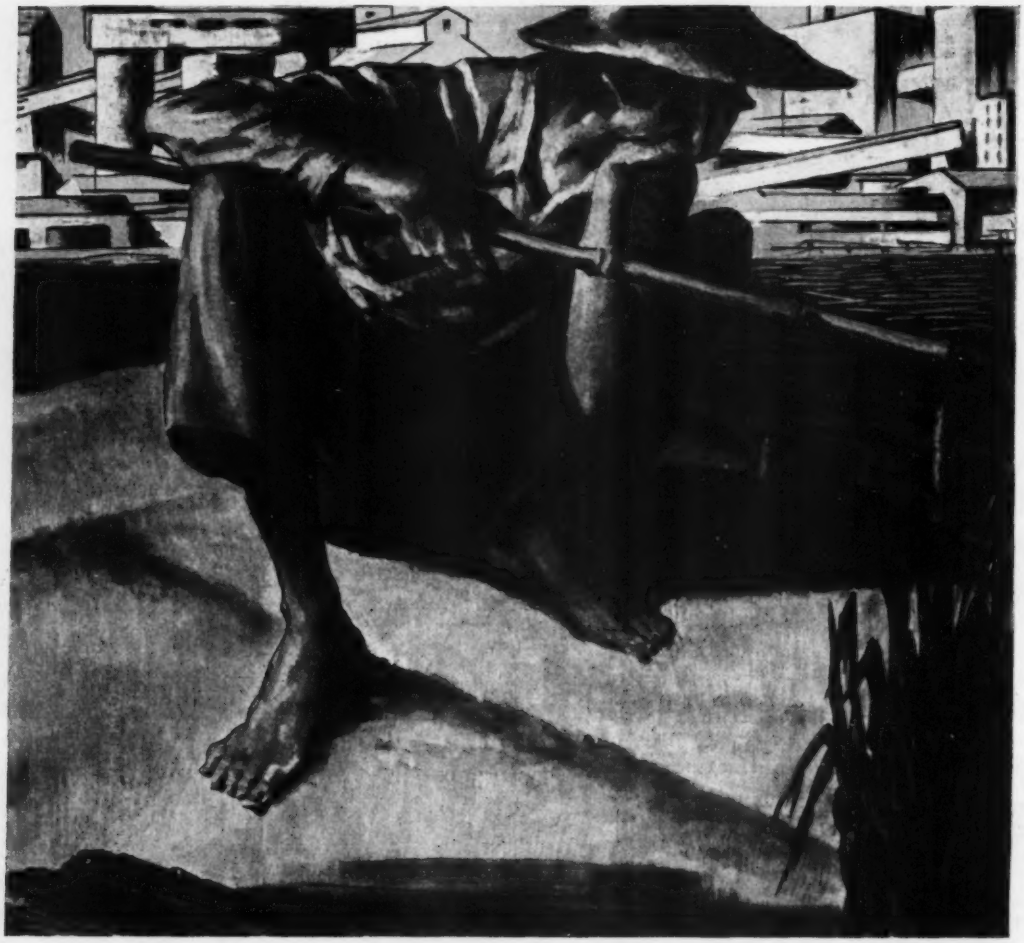
DOWNINGTOWN MANUFACTURING CO.
DOWNINGTOWN, PA.

West Coast Representative:
John V. Roslund, Pacific Building
Portland 4, Oregon

DOWNINGTOWN
WALLBOARD MACHINES
MODERNIZATION IS PROFITABLE

DESIGNERS AND BUILDERS OF PAPER, BOARD AND FELT MACHINES SINCE 1860

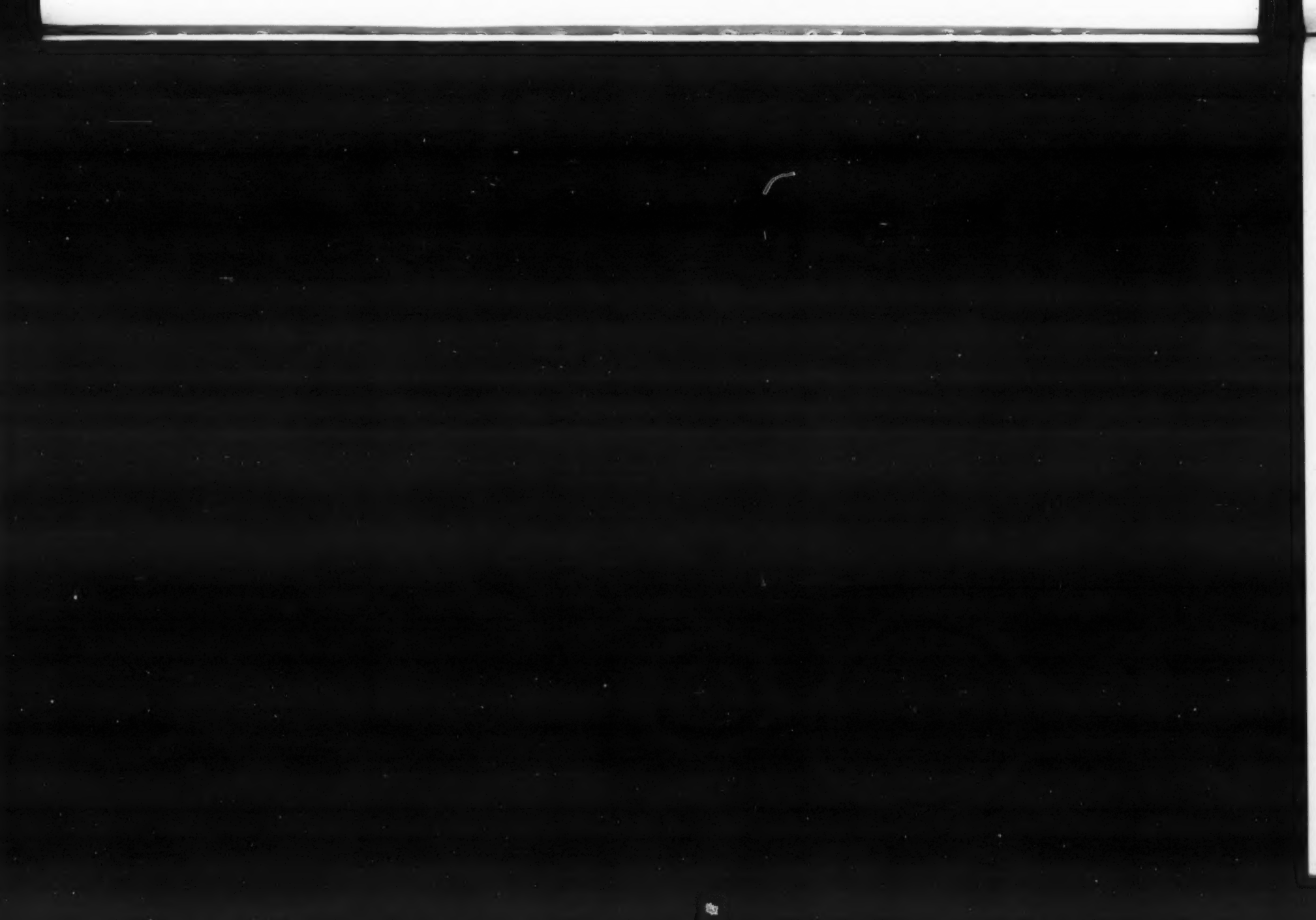
THE SOUTH—another in a series of scenes . . . areas where Appleton Wires serve the paper industry.

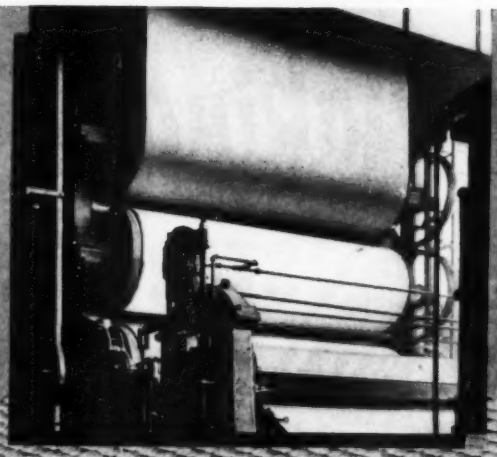


THE SOUTH—behind its carefully preserved tapestry of "old South" tradition, picturesque local color and romantic charm—is justifiably proud of thriving new industry, new commerce, new investments.

Here, too, pacing this energetic, creative, expanding activity, you'll find the paper industry. And, practically all of these mills already know that *Appleton Wires are Good Wires!*

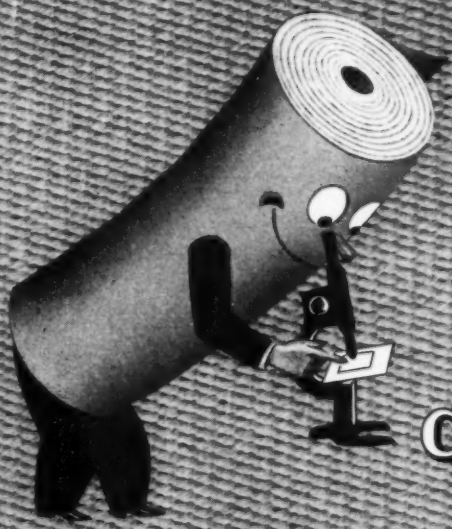
APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN





SCIENTIFIC CONSTRUCTION* Makes The Big Difference In DRYER FELTS

WOODBERRY 887



REINFORCED DRYER FELT GIVES YOU SCIENTIFIC CONSTRUCTION

Determining Yarn Tensile Strength with 300-lb. vertical test. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

*Asbestos yarns woven into the face of patented Woodberry #87 dryer felts at scientifically determined intervals give you longer wear and smoother operation. Paper mills have learned to count on lowered steam consumption and consistent quality with Woodberry 887. For dryer felts that are low on cost, high on performance, specify Woodberry 887.

Mt. Vernon-Woodberry Mills

TURNER HALSEY
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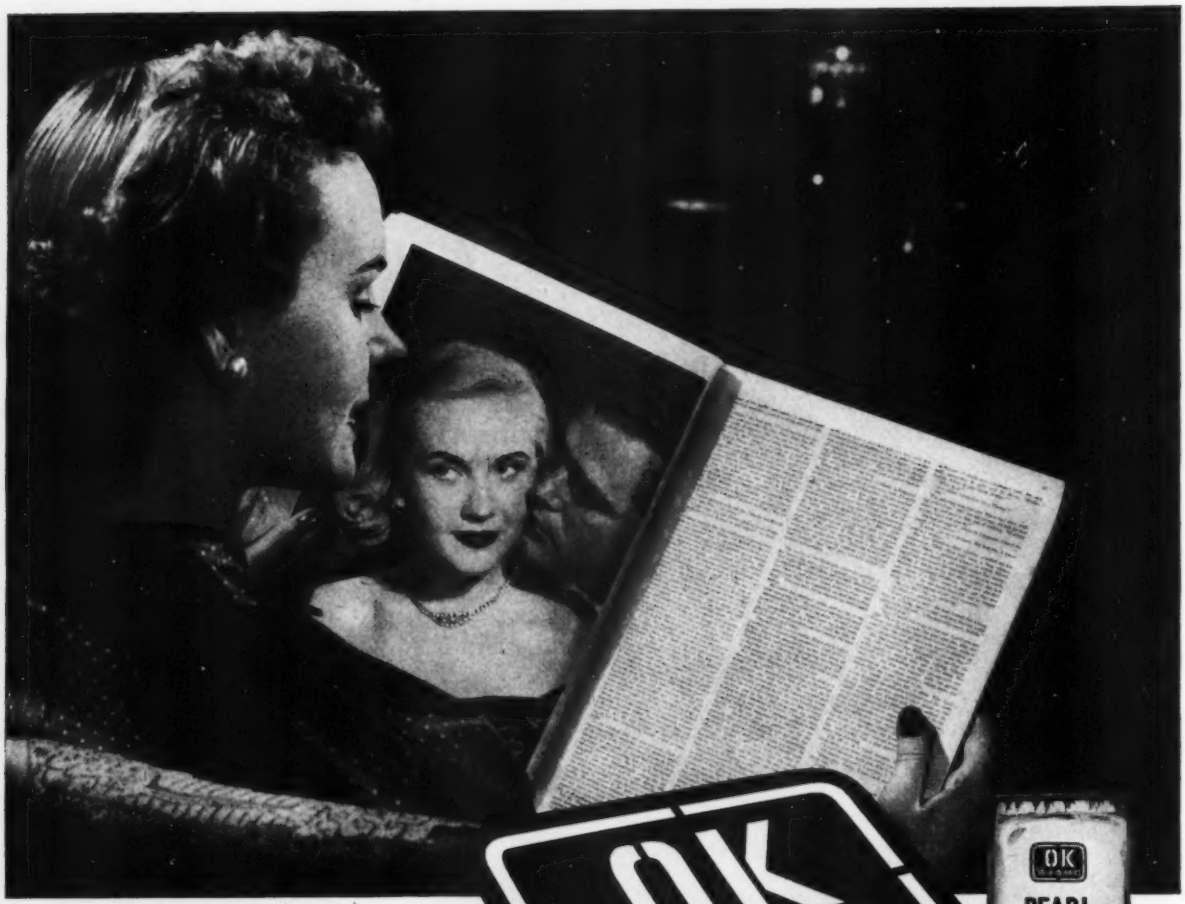
Quality Paper Making calls for OK BRAND STARCHES

for tub, beater and calender sizing— for coating and adhesives



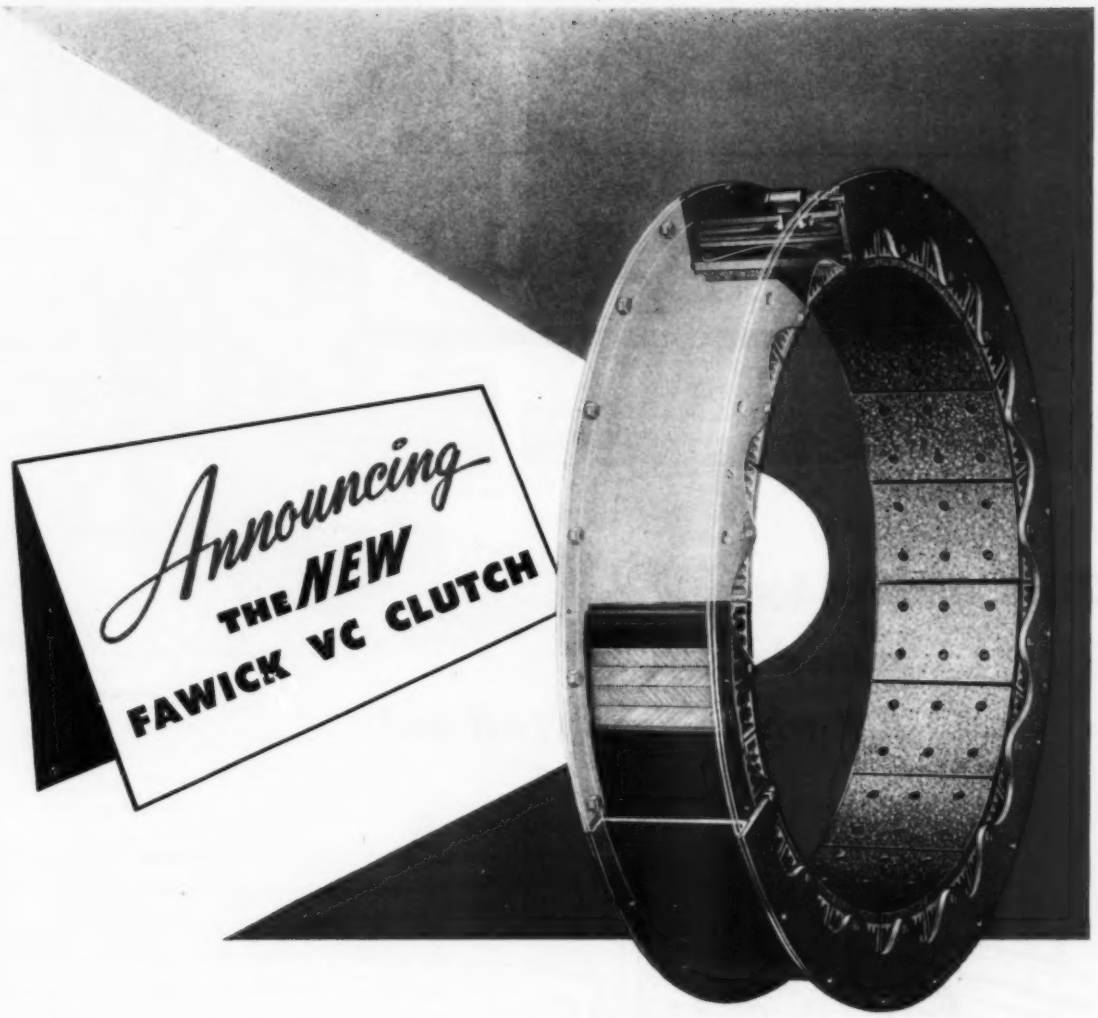
FREE TECHNICAL SERVICE!

Some of the industry's outstanding experts in the use of starch in paper making are on the staff of Hubinger's famous laboratories. You are invited to consult these experts on your production problems—without cost or obligation on your part.

...the Stamp of Quality!

THE HUBINGER CO. (EST. 1881), KEOKUK, IOWA

Branch offices: New York • Boston • Charlotte • Chicago • Los Angeles



The NEW completely-ventilated
FAWICK TYPE VC *Air-Ring* CLUTCH

FAWICK announces another air-operated clutch advancement. The NEW FAWICK TYPE VC *Air-Ring* CLUTCH is specifically designed and built to fit the needs of manufacturers and users of heavy equipment on the roughest applications.

Design features found only in this NEW VC CLUTCH include:

1. Cooler operation inherent in drum clutch design *plus* isolation of the operating tube from the heat-generating friction surface.
2. Riveted, Replaceable Friction Lining.
3. Loose, Expanding Operating Tube which can be replaced without removing clutch from shaft.

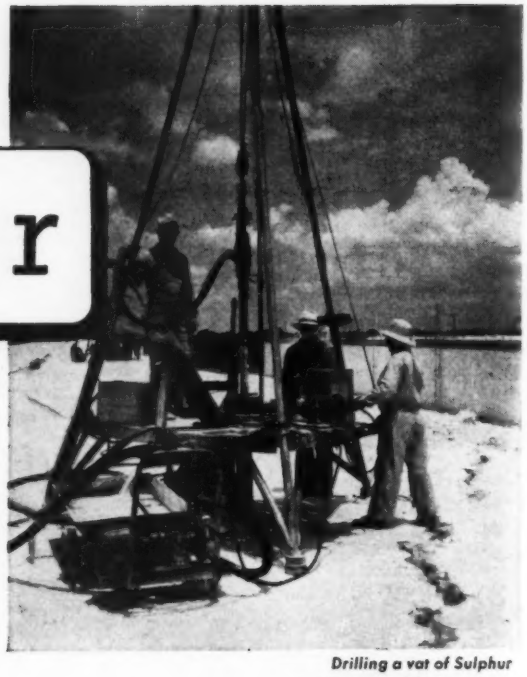
The FAWICK Rigid-Type VC CLUTCH is unmatched for heavy-duty service with high-starting loads and sustained slippage where generated operating heat lowers clutch efficiency and shortens operating life. With its cooler operation the FAWICK VC provides "new clutch" performance throughout a long maintenance-free life.

For further information on the NEW FAWICK VC CLUTCH write to the main office, Cleveland, Ohio, for Bulletin ML-102.

FAWICK AIRFLEX DIVISION
FEDERAL FAWICK CORPORATION
9919 CLINTON ROAD • CLEVELAND 11, OHIO

FAWICK Airflex
INDUSTRIAL CLUTCHES AND BRAKES

Sulphur



Drilling a vat of Sulphur preparatory to blasting down

Thousands of tons mined daily, but where does it all go?

All through the open seasons—spring, summer and fall—homes everywhere are being painted, old houses as well as new getting much needed protection from the elements. It's an activity seen by millions but few realize how important Sulphur is to this phase of our domestic economy. Actually, it's an essential commodity.

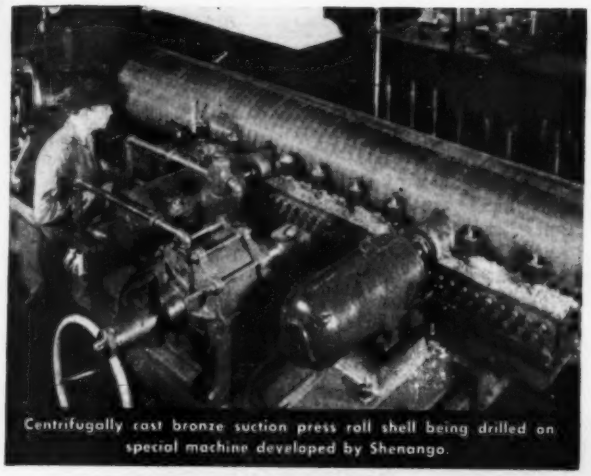
That's right. Paint pigments constitute one of the largest individual consumers of Sulphur . . . in the form of sulphuric acid. Government statistics show that for the year 1950 some 1,260,000 tons of 100% H_2SO_4 were consumed by producers of lead, zinc and titanium pigments. Translated into Sulphur, this means around 400,000 long tons which is a lot of Sulphur! In fact, the pigment industry stands 5th on the list of the many industries that consume Sulphur in one form or another during their manufacturing processes.

The Sulphur Industry indeed has many mouths to feed, all important to our economy and standard of living.

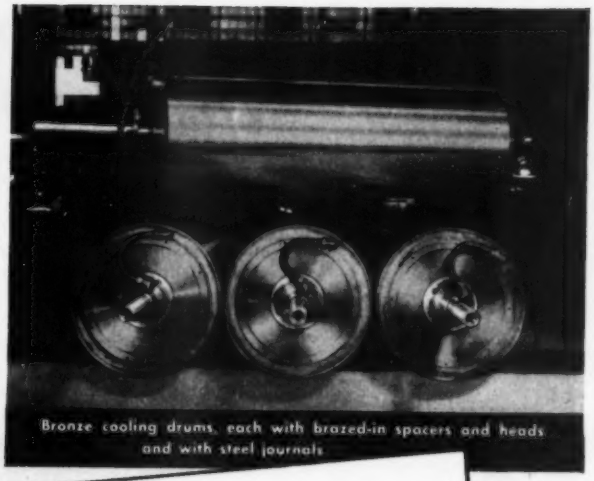
Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Mines: Newgulf and Moss Bluff, Texas



Centrifugally cast bronze suction press roll shell being drilled on special machine developed by Shenango.



Bronze cooling drums, each with brazed-in spacers and heads and with steel journals.

Why it pays to Specify Shenango

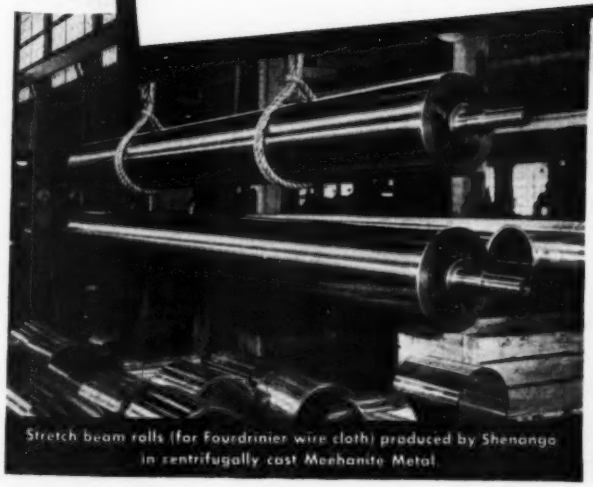
BECAUSE of Shenango's centrifugal casting process and high precision machine work, Shenango-made rolls and roll assemblies give better service, last longer and save you dollars. Centrifugal casting provides stronger, pressure-dense metal, finer, more uniform grain and freedom from sand inclusions, blowholes and other weakening defects.

Shown on this page are only a few of the many types of rolls, roll cores, drums and assemblies produced in bronzes and Meehanite Metal by Shenango for use in the paper industry.

It will pay you to specify Shenango. For further information or data on meeting your specific needs, write to: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio (*Executive Offices: Pittsburgh, Pa.*).

SHENANGO

ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE METAL



Stretch beam rolls (for Fourdrinier wire cloth) produced by Shenango in centrifugally cast Meehanite Metal.

Bronze breast roll with steel inserts, centrifugally cast, finished and assembled in the modern Shenango shops.

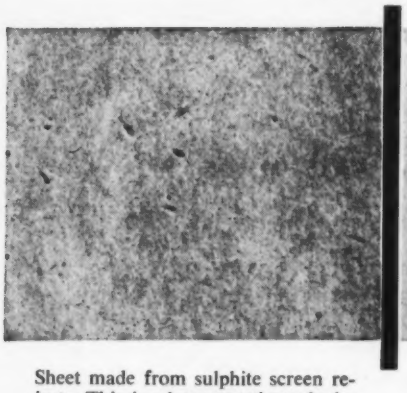
Results are spectacular with

Bauer CENTRI • CLEANERS

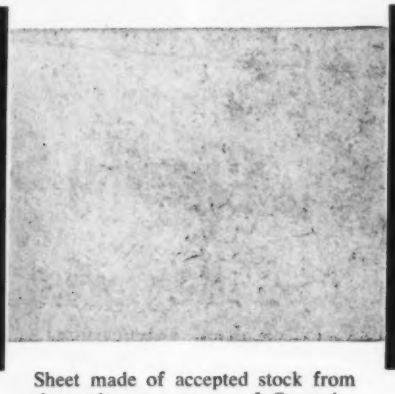
Everyone who sees examples of the work done by Centri • Cleaners is astonished at the results. The examples are sheets made from the stock which goes into the Centri • Cleaners, sheets made from the accepted stock, and sheets made from the final rejects. Some photographic reproductions are shown below, but they are not as sensational as the sheets themselves.

Our representatives have assortments of sheets from a number of kinds of stock processed with the No. 600 and No. 622 Centri • Cleaners. If you wish to see the examples, let us know and our representative in your area will show them to you on his next call.

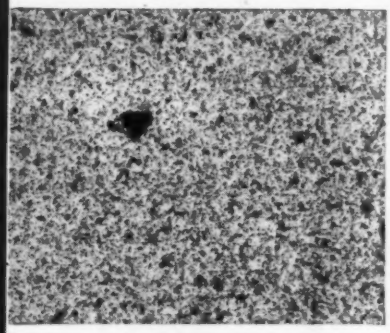
In the meantime, we suggest that you ask for our Bulletin No. P-4 which explains the construction and operation of Centri • Cleaners.



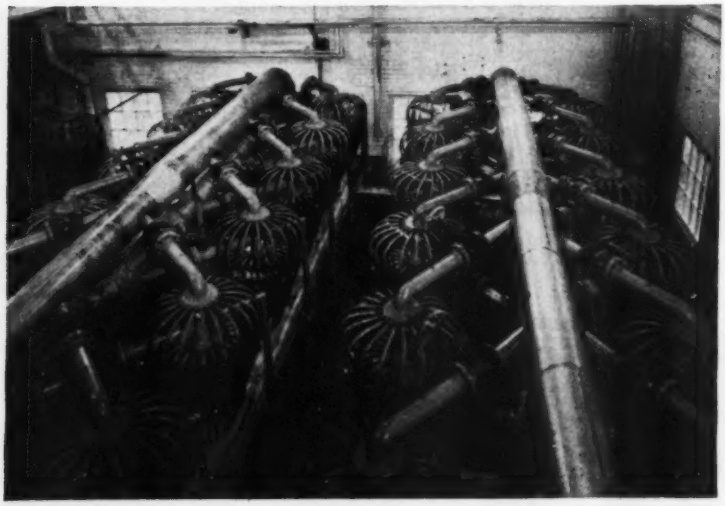
Sheet made from sulphite screen rejects. This is what went through the Centri • Cleaners.



Sheet made of accepted stock from the primary group of Centri • Cleaners.



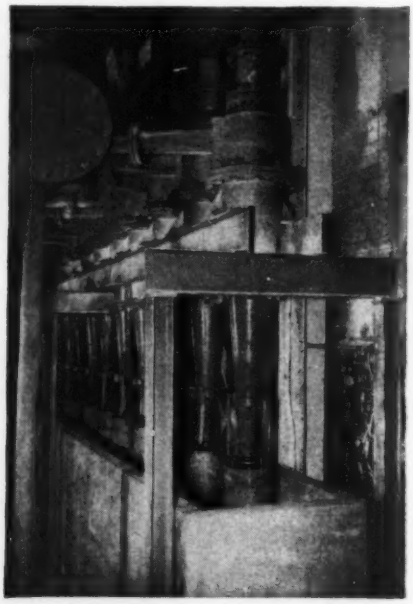
Sheet made of Centri • Cleaner final rejects. This sheet consists of sand, bark, shives, and other refuse.



Overhead view of No. 600-3″ Centri • Cleaners manifolded into inlet and outlet headers. These Centri • Cleaners are cleaning unbleached sulphite pulp.

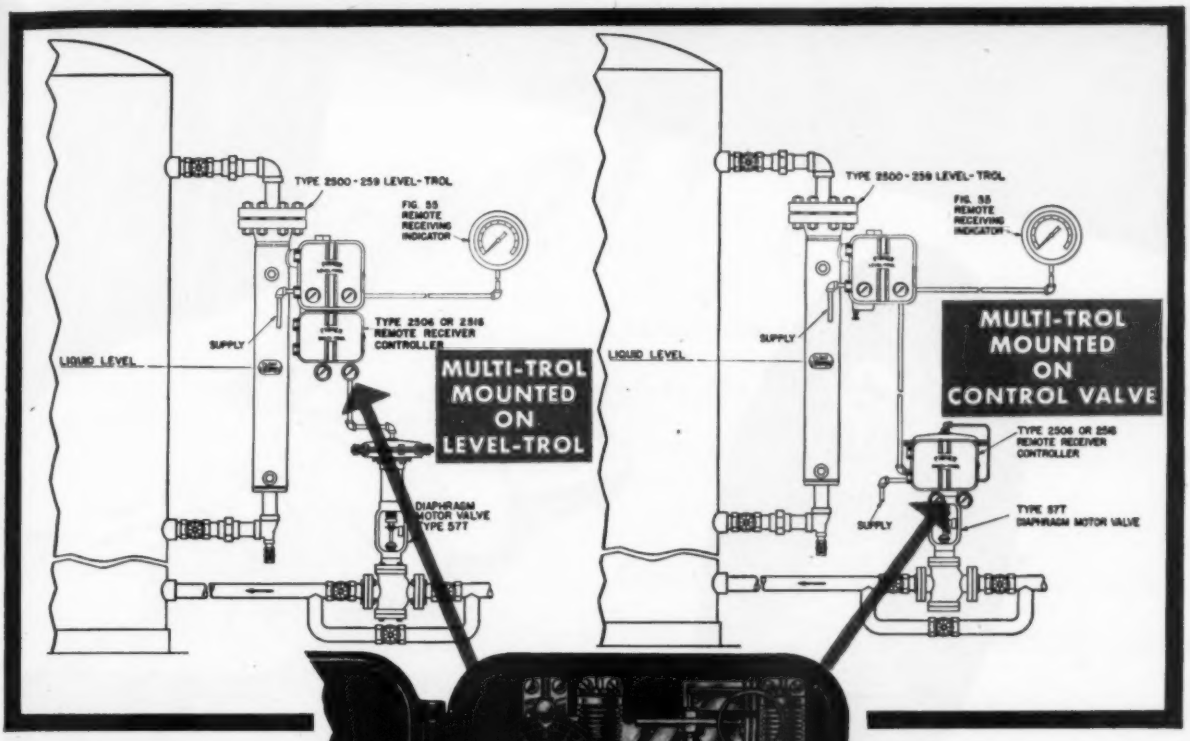
Our representative will be glad to show you actual examples of work done by Centri • Cleaners.

Ask for Bulletin No. P-4



Installation of ten primary and one secondary No. 622-12″x4″ Centri • Cleaner ahead of a paper machine. Each group is manifolded into inlet and outlet headers.

THE BAUER BROS. CO. • 1759 Sheridan Ave. • Springfield, Ohio



FISHER®

Type 2516 Multi-Trol with Re-set

Dual Control LEVEL-TROL

VERSATILITY OF MOUNTING FOR EASY "ON THE SPOT" ADJUSTMENT

This new Fisher Controller consists of a primary pilot (standard Fisher Series 2500 Level-Trol—used for indicating or controlling level) whose output is transmitted by pneumatic link to secondary pilot—the Multi-Trol.

MULTI-TROL FEATURES

1—Available with reset (Type 2516) or without reset (Type 2506). (Reset may be added to units originally furnished without it.)

2—Proportional band adjustment is incorporated into the remote receiver controller with a range of 10% to 200%.

3—Level control point is adjustable manually in the case by level set adjustment. For remote set—provided with connection for remote air loading.

4—Pressure balanced type of relay provides intermittent bleed and gives accurate stable control.

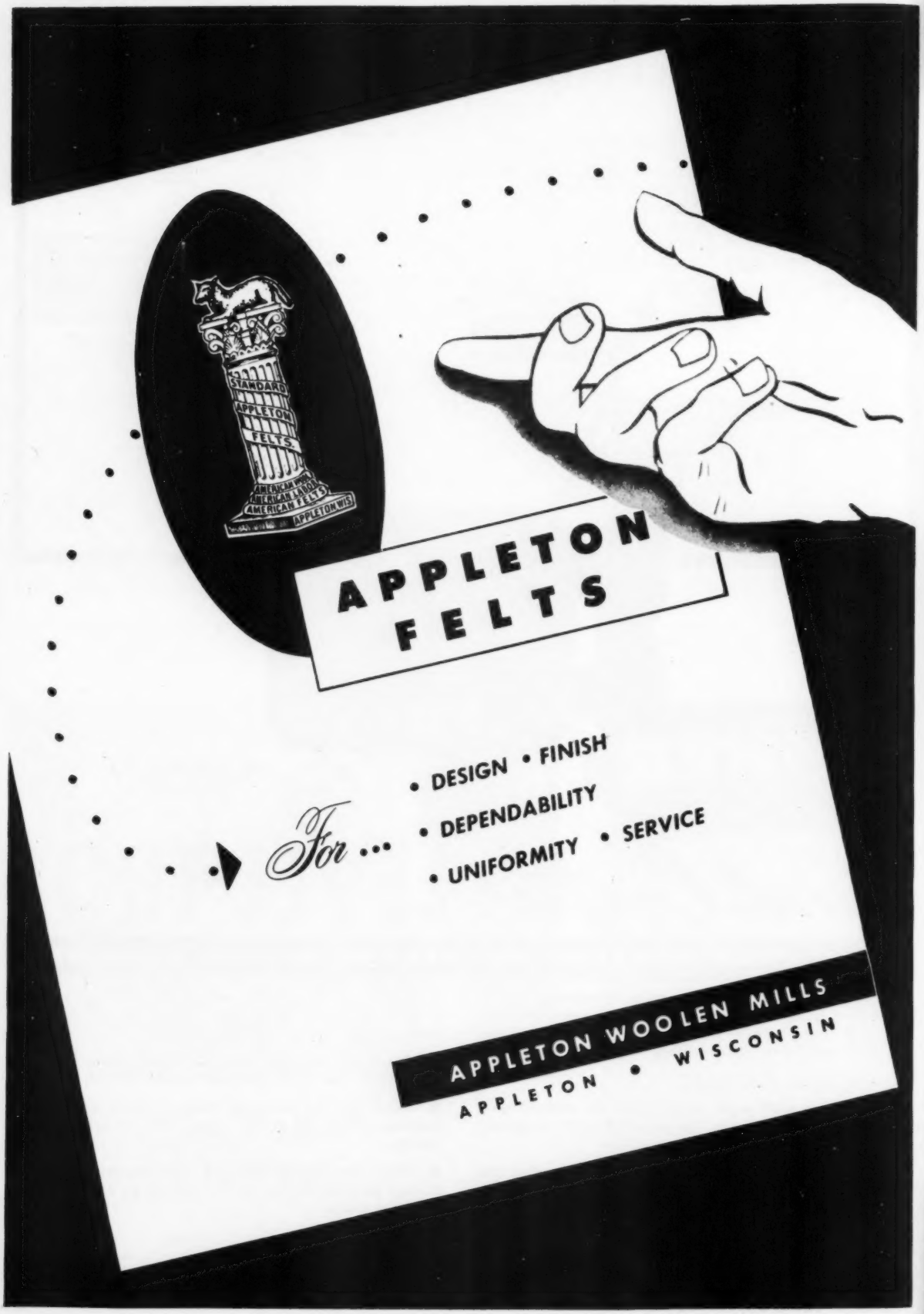
5—Pilot may be changed from a direct acting to a reverse acting unit or vice versa, thru the use of switch plates.

6—Pilot may also be changed from proportional action to two position action or vice versa, by repositioning a switch plate.

Write for Bulletin F-2506

FISHER GOVERNOR COMPANY, Marshalltown, Iowa

WORLD LEADER IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL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APPLETON
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For ...
• DESIGN • FINISH
• DEPENDABILITY
• UNIFORMITY • SERVICE
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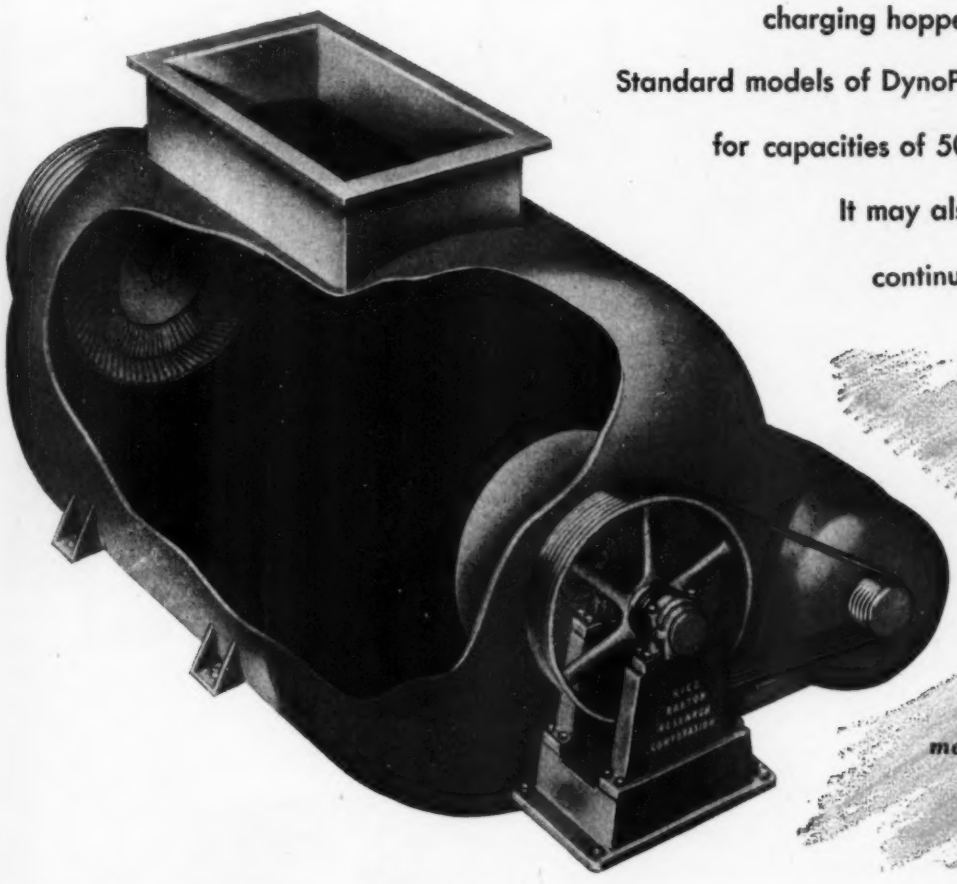
RICE BARTON

DynoPulper

is comprised of a horizontal circular vat, having two DynoPellers. Stock may be charged all at one time, in bale or loose form, through the topside charging hopper.

Standard models of DynoPulper are designed for capacities of 500 to 2000 pounds. It may also be arranged for continuous discharge.



Laboratory size models are available.

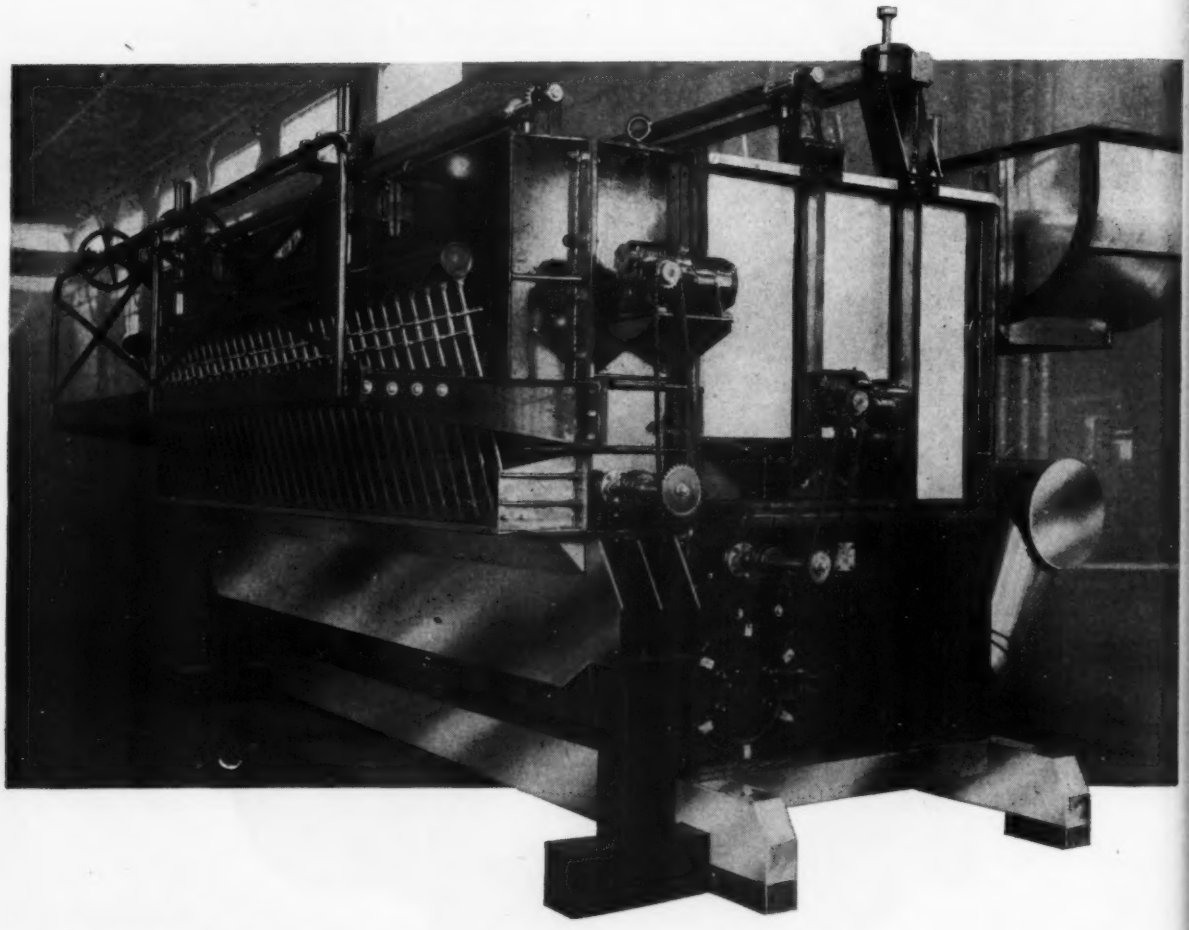
● The DynoPeller

is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock toward it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles under a gentle hydraulic pressure. This effective dynomizing action completely disintegrates the stock . . . separating each fiber from its neighbor while maintaining its original length.

RICE BARTON *Research Corporation*

WORCESTER 1, MASS.

NOTHING COSTS SO LITTLE AS EQUIPMENT . . . that DOES the Job!

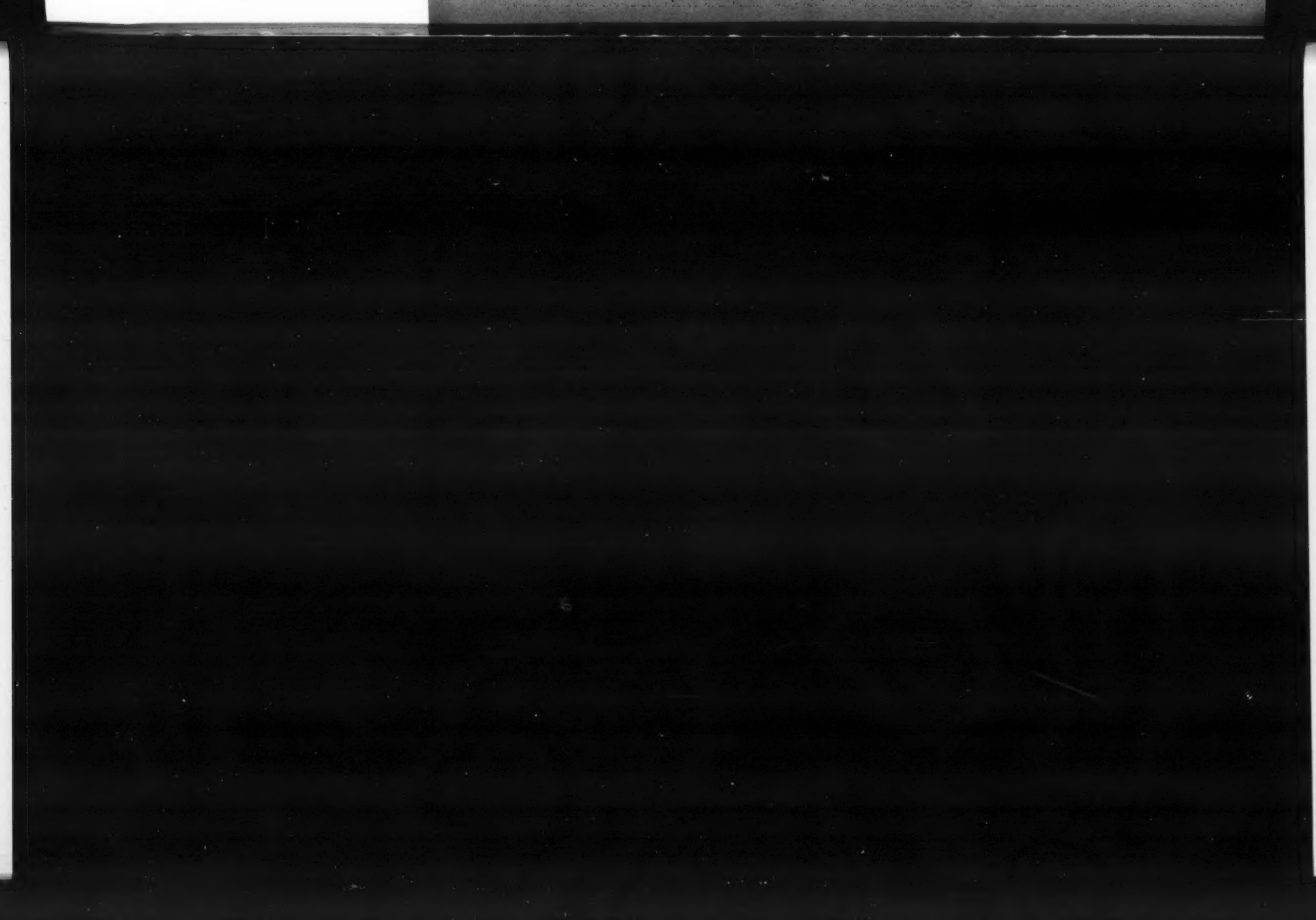


Your formation won't improve till you do something constructive to make it so. . . . Don't grope with small but costly changes in your present headbox. . . . The answer lies in new, modern equipment, tailored to YOUR requirements. . . . and with built-in adjustability to meet your varying needs. Write or phone for full information regarding improving your Inlet and Headbox equipment —on new or old paper machines.

INLET AND HEADBOX BY VALLEY!

VALLEY
Iron Works Company
APPLETON, WISCONSIN

FORMATION • CALIPER • LEVEL SHEET
INCREASED SPEED • HIGHER TEST



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brightness outstanding for brilliance

fastness superior fastness to light

dispersion quick, uniform distribution of dye throughout the stock furnish

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versatility Solar Blues and Solar Violet used alone, in conjunction with one another, or shaded with Solar Pink or Solar Green, produce a full range of eye appealing whites

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435 HUDSON STREET • NEW YORK 14, NEW YORK

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Burn REFUSE or COAL

With DETROIT STOKERS

Successful Installations Burn

Hogged Wet or Dry Bark
Hogged Wood
Wood Shavings and Sawdust
Wood Sander Dust
Spent Tan Bark
Corn Cobs
Coffee Refuse
Oat Hulls
Coconut Shells
Tobacco Stems
Leather Scraps
Peanut Shell Refuse

—Either separately or in combination with coal, oil or gas

The use of the Detroit RotoStoker and RotoGrate Stoker for various kinds of waste materials, followed quite naturally its established use for burning an extremely wide range of Coals, as well as high moisture Lignite.

Through the years, installations with steam boilers of a wide range of types and sizes have been made for burning waste materials.

If you have combustible refuse, the best disposal method is *burning it* which will avoid nuisance or pollution and at the same time will salvage the fuel value.

Detroit RotoStokers and Detroit RotoGrate Stokers are readily adapted and highly successful for refuse burning.

Write for this 24 page Booklet 505 which gives Engineering data on our refuse burning installations.

DETROIT SINCE 1898 STOKERS

DETROIT STOKER COMPANY

General Motors Building • Detroit 2, Michigan

District Offices in Principal Cities • Works at Monroe, Mich.

The Paper Industry Current Comment

Battle over foreign trade . . . bagasse presents problems . . . the Everglades

Between this date and the first of June, the problem of what to do with the nation's foreign trade program will be in the forefront of Washington debate. The slogan "Trade-Not-Aid" will be an issue in the demand of many business interests that this country put a halt to its giving away of domestic prosperity. The opponents of extensive changes in tariff rates for the benefit of foreign manufacturers see a growing danger to American industry, while other important interests, chiefly those of the mass production industries, believe that they can expand their export markets by an exchange of their exports for imports of goods produced by other American industries.

A month ago the so-called Bell Report, prepared by a commission named by President Truman, was presented to President Eisenhower. It was apparent from the start that the proposals were far too radical for the present Administration, even though the Republican platform has pledged a continuance of the reciprocal trade agreement policy.

A definite countermove in opposition to the proposals of the Bell Report was announced by President Eisenhower when he sent a special message to Congress asking for the one-year extension of the present Reciprocal Trade Agreement Act, pending an exhaustive study by a suggested new commission to evaluate the nation's future policy in the foreign trade-tariff field. No such commission has been named as yet, but it has become evident that there are behind-the-scenes negotiations to clarify the picture and eliminate any controversy between the Administration leaders and those who are opposed to any further radical duty rate reductions.

Acceptance if . . .

Roughly, the story is this: The President wants a year's stand-by legislation while a broad new program is formulated. Meanwhile, Congressman Simpson has introduced a bill in Congress to extend the present law for one year, but to restrict the power of the President to overrule recommendations of the Tariff Commission on utilization of the escape clauses of existing trade agreements and peril point data on proposed new agreements. Behind the scenes, it has been reported that the Simpson bill proponents may accept the President's request for stand-by legislation pending the proposed study, if the President names two Republican members of the Tariff Commission who may be expected to counteract the free trade tendency of the three present Democratic members of the Commission. One such Republican has already been named, and a hold-over Republican member of the Commission has been named chairman to succeed the former Democratic chairman.

The proposal for a one-year moratorium is meeting considerable favor with certain domestic industries, of which the paper industry is reported to be one. It is difficult to forecast future developments in view of the fact that by the time this issue of The Paper Industry is in print the hearings before the Ways and Means Committee of the House of Representatives will have been held. After these hearings the recommendation of this committee goes to the House of Representatives for action, and the final House measure will then go to the Senate Finance Committee and the Senate itself for action. The present law expires the middle of June, so some action will be taken without delay.

Eventual agreement

It will not be surprising if Congress eventually accedes to the request in the President's message. The Simpson bill, in addition to its proposals for a modification of the reciprocal trade agreement program, would put teeth in the Anti-Dumping Act to make that act an automatic functioning measure on the same terms as those contained in similar anti-dumping legislation that exists among other countries, such as Canada. Such a strengthening of the Anti-Dumping Act would conform to the provisions for such legislation embodied in the agreements reached under GATT, the General Agreement on Tariffs and Trade.

Bagasse has drawbacks

All is not brightness and light in the discussions of the use of bagasse as a papermaking raw material. According to George F. Underhay, director of Bowater's development research, who spoke on "Raw Materials for Paper" at the Royal Society of Arts in London, bagasse is being boosted far beyond its potentialities. He says that its 50 per cent moisture would present a costly transportation problem, and that the fiber is less adaptable than wood, even if available for paper stock instead of its present large use as fuel for sugar mills.

Experiments on new papermaking materials continue, however, the latest being the use of Florida sawgrass in the actual production of newsprint used by a Tallahassee newspaper. A Florida firm has announced that it will build a 50-ton mill for the production of pulp through what is known as the Celsedge process.

Activity down under

Another allocation of funds by the United States Export-Import Bank has been granted to facilitate the construction of a newsprint mill in New Zealand. The allocation totals over $15,000,000, as part of a proposed $60,000,000 enterprise to produce 75,000 tons of newsprint and 36,000 tons of kraft annually.

The Forest Service has told the House

Correction

In the March issue of The Paper Industry, Dr. Louis T. Stevenson, then APPA economist, was misquoted in remarks made at a press conference staged during the APPA national meeting. The quotation as it appeared in our pages was as follows: "The paper industry in 1932 operated at 19½ per cent of capacity." This should be corrected to read: "In 1932 the paper industry operated at 58 per cent of capacity, while the steel industry operated at only 19½ per cent of capacity."

of Representatives Interstate Commerce Committee that the time has come for the successful development of a newsprint industry in Alaska to use national forest wood. The Forest Service estimated that adequate supplies of newsprint are available for 1953, but that long-range requirements will involve new capacity.

Stockholders Group Fights Merger of C-Z and St. Helens

A committee of stockholders of St. Helens Pulp & Paper Co., St. Helens, Ore., has been formed to fight the proposed exchange of stock with Crown Zellerbach Corp. George H. Buckler is committee chairman. Supporting the move is Carl A. Oberdorfer, younger son of the founder of the company, Max Oberdorfer Sr.

In a letter to stockholders the committee charged that Crown Zellerbach would be paying much less than the combined valuation of St. Helens properties. A hearing was scheduled for San Francisco April 21 in which a permit authorizing the exchange would be sought. C-Z has announced that it will go ahead with the proposal provided it can gain 80 per cent of the stock of St. Helens.

Financial Reports

The prospect of peace in Korea is generally ascribed as the reason for the sharp break in securities prices during March and April. Paper mill securities followed the general market down to the lower level, but it was apparent from actual sales that holders of such securities were not seeking to unload any large blocks of stock. In many cases current prices are bid and asked prices only, indicative that quotations were not necessarily an indication of actual sales at lower prices.

Net incomes

American Writing Paper Corp.—Net income in 1952 was $180,271, as compared with $180,956 in 1951.

Anglo-Canadian Pulp & Paper Mills Ltd.—Net 1952 profit was $2,152,554, compared with $4,246,134 for 1951.

A. P. W. Products Corp.—Deficit for 1952 was $43,307, compared with 1951's profit of $16,952.

Bathurst Power & Paper Co.—Consolidated net profit for 1952 was $1,825,895, compared with $3,485,927 for 1951.

Bemis Bros. Bag. Co.—Net income in 1952 was $2,671,927, as against $2,455,892 in 1951.

Bird & Son Inc.—Net 1952 income was $1,507,111, as compared with $1,550,777 in 1951.

Central Fibre Products Co.—Net income for the 28 weeks ended January 10 was $1,451,485, compared with $1,246,120 for the 28 weeks ended January 12, 1952.

Central Paper Co.—Deficit for 1952 was $386,914, compared with 1951's profit of $304,033.

Certain-teed Products Corp.—Net income for 1952 was $3,636,843, as compared with $5,060,153 in 1951.

Chesapeake Corp. of Virginia—Net income for the 12 weeks ended March 22 was $540,251, as compared with $661,187 for the comparable 1952 period.

Clopay Corp.—Net loss for 1952 was $220,868, compared with a net profit of $286,902 in 1951.

Consolidated Paper Corp. Ltd.—Net profit for 1952 was $10,337,981, compared to $12,905,574 for the year before.

Consolidated Water Power & Paper Co.—Net income in 1952 was $4,424,171, as against $4,645,882 in 1951.

Container Corp. of America—Net profit for the quarter ended March 31 was $2,429,000, as compared with $2,778,000 for the same 1952 period.

Continental Can Co.—Net earnings for 1952 were $14,387,839, compared to $15,210,720 for 1951.

Continental-Diamond Fibre Co.—Net income for 1952 was $746,803; for 1951, $1,234,078.

Cornell Paperboard Products—For 1952 net profit was $1,414,606, compared with $1,631,349 in 1951.

Corrugated Paper Box Co.—Net profit for 1952 was $326,635, compared to $335,550 in 1951.

Crown Zellerbach Corp.—Net income for the nine months ended January 31 was $16,020,965, compared with $17,867,472 for the same period the year before.

Dennison Mfg. Co.—1952 earnings were $1,778,000, as compared to $2,119,000 for 1951.

Dixie Cup Corp.—Net income for 1952 was $2,302,789, as compared with $2,715,875 in 1951.

Donnacona Paper Co. Ltd.—Net 1952 income was $1,138,122, compared with $1,644,965 in 1951.

Eddy Paper Corp.—Net profit for 1952 was $3,529,151, compared to $4,747,047 in 1951.

Eddy Paper Co. Ltd. (and wholly owned subsidiary, *The E. B. Eddy Co.*)—Consolidated net income for 1952 was $782,184; for 1951, $1,406,694.

Ex-Cell-O Corp.—Net profit for the quarter ended February 28 was $1,625,115, compared to $1,069,702 for the same 1952 period.

Federal Paper Board Co.—Net income for 1952 was $2,397,058, as against $2,397,875 the preceding year.

Flintkote Co.—Net income for 12 weeks ended March 28 was $745,666, compared with $382,282 for the same 1952 period.

Fort Wayne Corrugated Paper Co.—Net income for 1952 was $1,195,492, compared with $1,629,440 in 1951.

Fraser Companies—Net profit for 1952 was $3,455,575, 36.4 per cent lower than 1951's $5,433,663.

Gair Co. Inc. (Robert)—Net income for the first 1953 quarter was $1,627,431, compared with $1,190,322 in the same period in 1952.

Gaylord Container Corp.—Net income for the year ended December 31 was $8,116,660, compared to $8,716,369 in 1951.

General Box Co.—Net profit for 1952 was $768,730, compared with $1,135,038 the year before.

Glatfelter (P. H.) Co.—Net income for 1952 was $734,470, as against $792,493 the previous year.

Great Lakes Paper Co.—Net profit for 1952 was $2,656,377, less than the 1951 net of $4,734,494.

Hammermill Paper Co.—Net profit for the quarter ended September 30 was $239,610, compared to $356,685 for the same period in the previous year.

Hinde & Dauch Paper Co.—Net income for the March quarter estimated at $860,000, compared to $754,485 last year.

International Cellucotton Products Co.—Net 1952 income was $5,366,958, compared to $5,757,960 for 1951.

Kalamazoo Paper Co.—Net profit for 1952 was $841,205, compared to 1951's $839,939.

MacAndrews & Forbes Co.—Net income for the first quarter was $266,933, as compared to $267,111 in the same period last year.

MacLaren Co. Ltd. (The James)—Consolidated net profit for the 13 months ended December 31 was $2,943,631; in the 12 months ended November 30, 1951, $2,778,561.

Masonite Corp.—Net profit for the six months ended February 28 was $1,442,874, compared to $1,840,907 the year before.

Mead Corp., The—Net 1952 earnings were $5,953,501, compared to $6,109,237 in 1951.

Morris Paper Mills—Net income in 1952 was $1,222,008, compared with the $1,593,062 for 1951.

Nashua Corp.—Net income for 1952 was $835,962, compared with $920,413 in 1951.

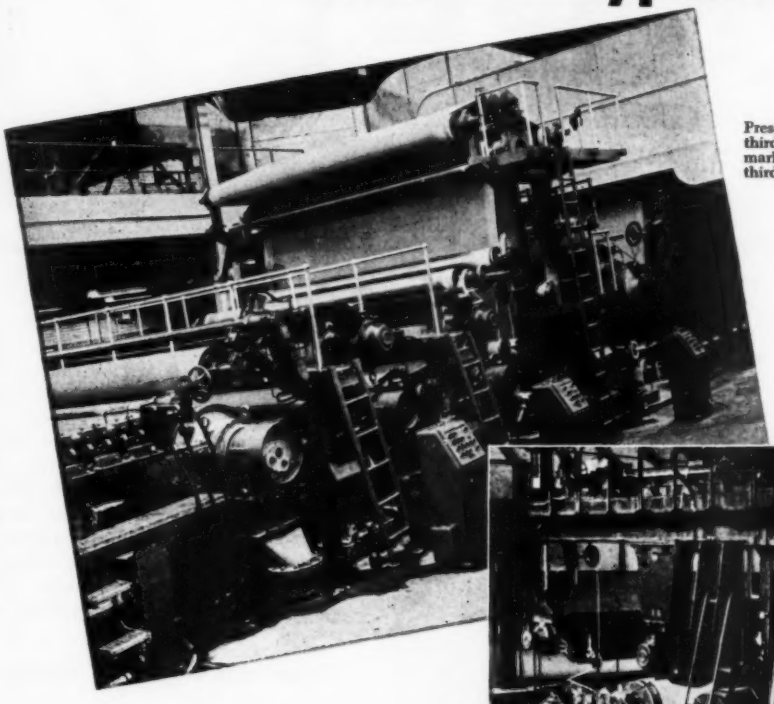
National Container Corp.—Net income for the year ended December 31 was $3,812,000, compared to $8,617,000 in 1951.

National Gypsum Co.—1952 net income was $7,249,480, compared with $7,395,983 for 1951.

National Vulcanized Fibre Co.—Net profit for 1952 was $590,317, compared to $1,455,156 in the previous year.

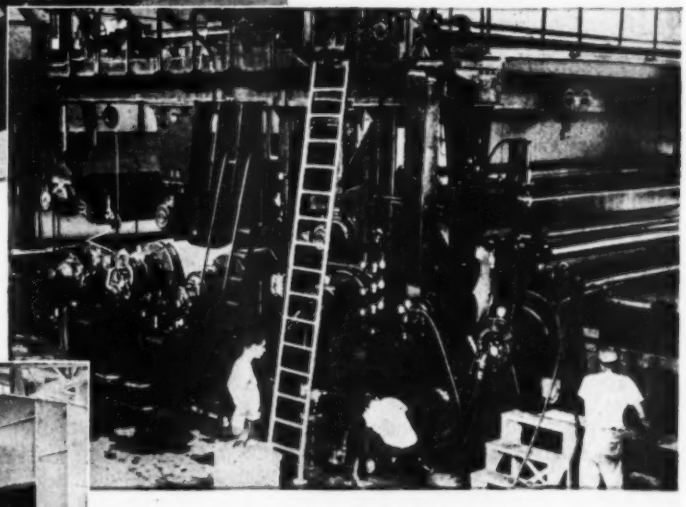
Nekoosa-Edwards Paper Co.—Net earnings for 1952 were $1,777,739, down

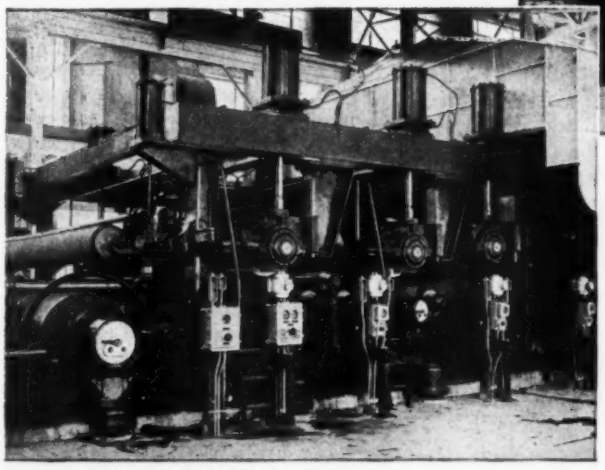
Modernize with a new Puseyjones Press Part



Press Part with two Suction Presses and reversed third press. A pneumatic controlled water-marking device operates in connection with the third press.

Press Part with four suction rolls, two in combination with a common center roll in vacuum pick-up arrangement.





Simplex Press Part showing improved Lump Breaker and Couch Draw Roll arrangement.

Puseyjones engineers have assisted in the rebuilding and modernization of papermaking machines in many leading mills, assuring better qualities, higher speeds, bigger profits. Take the Press Part, for instance. Recent developments in Press Sections pioneered by Puseyjones are important to every mill that wants to stay fully productive.

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slightly from the 1951 net of $1,832,630.

New Haven Pulp & Board Co.—Net income for the year ended September 30 was $833,427, compared with $896,638 for 1951.

Northern Paper Mills—Net income for 1952 was $1,085,665; for 1951, $1,276,028.

Olin Industries Inc.—Net 1952 income was $10,799,643, compared to 1951's $12,108,673.

Oxford Paper Co.—Net profit for 1952 was $2,666,631, compared with $3,047,312 in 1951.

Paterson Parchment Paper Co.—Net loss for 1952 was $25,513, contrasted to 1951's net profit of $369,683.

Price Bros. & Co. Ltd.—Net profit for 1952 was $6,055,588, less than the $8,568,558 of 1951.

Riegel Paper Corp.—Net income for 1952 was $1,087,427, as compared to $1,231,470 in 1951.

River Raisin Paper Co.—Income after taxes in 1952 was $615,388, as against $710,652 in 1951.

Rolland Paper Co. Ltd.—Net profit for 1952 was $265,831, compared with $338,324 in 1951.

St. Croix Paper Co.—Net profit for 1952 was $882,314, compared with $882,837 in 1951.

St. Helens Pulp & Paper Co.—Net 1952 income was $1,090,940, compared to $1,215,464 in 1951.

St. Lawrence Paper Corp.—Consolidated net profit for 1952 was $6,210,511; for 1951, $9,247,477.

St. Regis Paper Co.—Net income for the first quarter was $3,760,587, as against $3,504,599 last year.

Scott Paper Co.—Net income for 1952 was $10,707,346, compared with $10,886,311 in 1951.

Seaboard Container Corp.—Net income for 1952 was $499,118, compared with $1,010,063 in 1951.

Sidney Roofing & Paper Co.—Consolidated net profit for 1952 was $200,420. compared to 1951's $235,162.

Smith Paper Mills Ltd. (Howard)—Net profit for 1952 was $4,013,011, compared to $4,914,725 in 1951.

Sonoco Products Co.—Net 1952 income was $1,447,543, as compared with $1,675,989 in 1951.

Sorg Paper Co.—Net 1952 earnings were $235,444, compared to 1951's $612,691.

Southland Paper Mills Inc.—Net earnings for 1952 were $2,999,122, compared to $2,893,174 in 1951.

Standard Paper Mfg. Co.—Net income in 1952 was $130,736, as against $134,148 for the year before.

Stone Container Corp.—Net 1952 earnings were $1,448,354, compared to $1,579,685 in 1951.

Sutherland Paper Co.—Net 1952 income was $2,503,958, as compared with $2,647,530 in 1951.

Union Bag & Paper Corp.—Net 1952 income was $11,060,486, as compared to $12,217,685 in 1951.

United Board & Carton Corp.—Net profit for 36 weeks to February 7 was $602,586, compared with $644,399 last year.

United States Envelope Co.—Net income for 1952 was $872,945, as against $1,365,223 in 1951.

United Wallpaper Co.—Net income for the last two quarters of 1952 was $120,441, as compared with a deficit of $338,160 for the comparable period in 1951.

Warren (S. D.) Co.—Net income for 1952 was $1,694,381, as compared with $2,388,701 for the previous year.

Dividend declarations

Denison Mfg. Co. has declared a stock dividend of 5 per cent on the common A stock and on the voting common stock, the latter to be paid in common A shares, payable May 15 to record of April 14; also, the regular quarterly of 30 cents on the increased number of common A shares and on the common voting stock, payable June 3 to record of May 18; and the regular quarterly of $2 on the debenture stock, payable on the same dates.

Gair Co. Inc. (Robert) has declared a dividend of 37½ cents a share in respect to the second quarter of 1953 on the common, payable June 10 to record of May 20.

Glatfelter (P. H.) Co. has declared a dividend of 25 cents a share on the common, payable May 1 to record of April 15; also, the quarterly dividend of 56¼ cents on the 4½ per cent cumulative preferred, also payable May 1 to record of April 15.

Paper mill corporate changes

Bathurst Power & Paper Co. Ltd. is offering a new $6,000,000 issue of 5¼ per cent series "A" debentures at 100 and accrued interest through Nesbitt, Thomson & Co. and Midland Securities Corp. The 20-year debentures, due April 1, 1973, are redeemable at prices ranging downward from 105 to par at maturity. An amount sufficient to retire $240,000 principal amount is to be set aside annually from 1955 to 1972 as a sinking fund. Proceeds of the issue are "for general corporate purposes."

Denison Mfg. Co. stockholders have approved an increase in the authorized number of common A shares from 500,000 to 600,000.

Donnacona Paper Co. Ltd. common shares have been removed from the listings of the Canadian Stock Exchange, as a large portion of them have been exchanged for shares of Howard Smith Paper Mills Ltd.

Lansdowne Paper Mill Inc., Lansdowne, Pa., has been sold at sheriff's sale to the former owner, Hudson Pulp & Paper Corp., which at one time operated the mill as the Mazer Division.

Marathon Corp. of Menasha, Wis., has registered with the Securities and Exchange Commission its plan for taking over Northern Paper Mills of Green Bay as a subsidiary. Marathon registered 614,872 shares of $6.25 par value common stock. It plans to exchange the

common for Northern's outstanding stock. According to the plan, Marathon would offer Northern stockholders six of its common shares for each share of Northern common and five Marathon shares for each share of Northern $100 preferred. This method could give Marathon all the stock of the Green Bay firm, consisting of 98,312 common shares and 5,000 preferred. No underwriting is involved. Marathon conditioned its offer, however, on acceptance by holders of at least 18,500 Northern common shares and 4,001 preferred.

National Gypsum Co. has announced the purchase for about $5,000,000 worth of its common of Abestone Co. of New Orleans, producer of asbestos-cement products.

Pittston Paper Corp. of Pittston, Pa., has been sold to Venezuelan interests, and machinery and equipment is being shipped to the South American country for installation in a proposed mill.

Union Bag & Paper Corp.'s 253,008-share offering of capital stock was 97.6 per cent subscribed through exercise of stockholders' rights. The 6,121 unsubscribed shares were taken up by an underwriting group headed by Morgan, Stanley & Co. and were reoffered at 48¼.

United Mfg. Co., Springfield, Mass., a producer of fancy papers, has been sold to Wyomissing Glazed Paper Co. of Reading, Pa.; there will be no change in operations or personnel.

New York Stock Exchange—Stocks

	Closing Prices April 20, 1953	March 20, 1953
A.P.W. Products	* 4¼–4⅝	5
Celotex	18⅛	19⅛
Same Preferred	* 16¾–16¾	16⅞
Certain-Teed Products	14⅝	15½
Champion P&F Co.	* 29⅝–30¼	31½
Same Preferred	99¼	*101½–103½
Chesapeake Corp.	* 29–30	31
Continental Diamond	12	12⅜
Container Corp.	41¼	43½
Same Preferred	*100⅝–101¼	*101⅜–103
Crown Zellerbach	80½	86¾
Same Preferred	98	102
Dixie Cup	36	37
Eastern Corp.	* 17–17½	17¼
Robert Gair	18⅜	19⅞
Gaylord Container	27⅝	29
Hammermill	15	15⅝
International Paper	50¼	56
Same Preferred	* 98¼–101	101
Kimberly-Clark	41⅜	44½
MacAndrews & Forbes	42⅝	44¼
Marathon	20⅜	21⅝
Masonite	21⅝	24¼
Mead Corp.	26½	28
Same Preferred	* 94–94¾	93½
National Container	9⅞	10⅜
Rayonier, Inc.	28⅝	30
Same Preferred	33⅝	33⅞
Scott Paper	56⅝	57½
Same 3.40 Preferred	* 86–87½	88
Same $4 Preferred	* 99–101	105
St. Regis Paper	22⅝	23½
Same Preferred	* 94¼–96	* 93¾–94
Sutherland Paper	26¼	26⅝
Same Preferred	108½	109⅝
Union Bag & Paper	46⅜	49¼
United Board & Carton	14⅞	16¼
United Wall Paper	3	3⅜
Same Preferred	* 25⅝–27	29¼
U.S. Gypsum	110⅝	115
Same Preferred	*165–169	176
West Virginia P & P	* 72½–74	78⅝
Same Preferred	*107–108	107½

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champion P&F Co. 3%	.....	.....
Mead Corp. 3%	.....	.....

American Stock Exchange—Stocks

Am. Writing	.....	10¼
Brown Co.	9⅞	11¾
Brown Co. $5 Preferred	90	97
Same Preferred $3	48¼	49½
Great Northern Paper	54⅝	57½
Puget Sound	.....	30½

* Closing Bid and Asked Prices

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The Paper Industry

May 1953

The Southern Industry's Changing Character

We have attempted in this issue to present an integrated picture of the southern pulp and paper industry. We do not profess to tell the whole story, because a complete story would fill volumes and is beyond the scope of this journal. Our purpose is to outline or define the southern industry's basic character which, in its simplest terms, can be described as highly productice, big, modern, versatile, and dynamic.

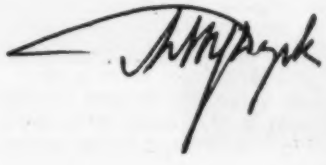
The South has most of the advantages and all the natural resources to support and sustain a flourishing and greatly diversified pulp and paper industry. It has a more than adequate supply of pulpwood from its rapidly growing tree species; it has its own research centers where new pulping processes and new uses for pulp and paper are being born and nursed through infancy; it has the managerial integrity, engineering knowhow, and equipment facilities to test and translate research discoveries into mill-scale production; it enjoys good employee-management relationships; and, apart from rapidly developing local converter and consumer markets, it has easy access to, and therefore a dominating influence on, many important world markets.

In our survey of the South we have been on the lookout for possible weaknesses, with special scrutiny of the still widely prevalent concept that the southern pulp and paper industry, by its very bigness, is geared and indefinitely confined to the production of large-volume standard pulp and paper products. We found little justification for the continued retention of such a concept. While the industry undoubtedly is geared for volume output, its modern and greatly improved equipment endows it with a flexibility and versatility that are difficult to match.

Actually it was mainly the limited demand of local markets for specialty products which, more than any other factor, had a curtailing effect on the southern pulp and paper industry's venture into the field of diversified products. With the rapid, and often spectacular, industrialization of the South in the last decade—which is still continuing at an undiminished rate—all this has changed, and local markets' demand for specialty products is increasing daily. Of particular impact to the improvement of market conditions has been the simultaneous and phenomenal development of the southern chemical industry which, in itself an important user of paper specialties, also provides the materials needed for the manufacture of improved and specialty paper products.

Even the relative scarcity of cheap hydro-electric power—the only real weakness which for many years has been a serious obstacle to the industrialization of the South—has been largely overcome through the development of high-pressure-steam generating boilers; and the advantages derived from cheap hydro-electric power have thereby been reduced to a more competitive level. However, despite this development, there are processes, like the production of groundwood pulp for newsprint for instance, which still can be operated more economically in the North.

No industry has undergone such rapid growth and transformation as the southern pulp and paper industry. Practically non-existent fifty years ago, and geared to the production of sulfate pulp and standard wrapping paper grades until a few years ago, today it emerges as a fully competent and highly diversified industry. Its many advantages are an assurance that this industry's growth and transformation have not yet been carried to completion. The discovery of new pulping processes and uses for paper and paper products may bring an even greater transformation in the next decade than the one we have witnessed in the last five years.



Bowaters Southern Paper Corporation, Calhoun, Tennessee
K. O. Elderkin, vice president and general manager

Processing and manufacturing trends in southern pulp and paper

A. W. J. DYCK

THE LAST FIVE YEARS have brought a radical change in the geographical picture of the U.S. pulp and paper industry. This industry, which now controls an overall national investment of $5,000,000,000 in plant assets and has an annual expenditure of $650,000,000 in wages paid to 400,000 employees, has so firmly established itself in the southern states that currently more than 50 per cent of our wood pulp is being produced in that area. Furthermore, there are no perceptible signs of an early leveling off of this tremendous development. New plant construction is being continued and manufacturing facilities are expanding at an undiminished rate.

Although originally sparked by the discovery at the Herty Foundation Laboratory of a pulping process for the fast growing southern pine, the southern expansion of the pulp and paper industry is in line with a generally greatly accelerated industrialization trend in that area. It is claimed that during the last decade seven new plants have come into production in the South each working day. During 1951 alone, a multi-million dollar plant was added each working day to the South's manufacturing facilities, representing an added capital investment of more than $3,000,000,000. It is of particular interest to the pulp and paper industry to note that more than 50 per cent of recently announced expansion in chemical manufacturing facilities are taking place in the South.

There is currently no pulp or paper mill product that cannot be manufactured in volume output by the southern mills, should the market demand it. The former concept that the southern manufacturing facilities would indefinitely be used for the production of low-cost, standard paper grades and paper products no longer holds. The paper mill products manufactured in the South now cover an extremely diversified range from bleached and unbleached krafts to newsprint, bonds, toweling, tissue, and even dissolving pulps for use in rayon, cellophane, and plastics. Paper specialties such as cigarette paper, cellophane, tissue paper, white envelopes, gumming and sanitary food papers, mimeograph papers, and bleached pulp for various glassine and grease-proof paper products are manufactured in volume quantities. The trend toward diversification also extends to the production of a greater variety of kraft-type papers, which range from the ordinary wrapping paper to asphalt-impregnated, wax-coated, and creped krafts. In the converter field, Union Bag & Paper Corp., St. Regis Paper Co., International Paper Co., and National Container Corp. claim that there is no type of container, box, or bag on the world market that is not now being manufactured in their southern mills.

The history of the southern pulp and paper industry covers a period of only 50 years. Beginning with rather indifferent and unsuccessful attempts to produce paper from bagasse in Louisiana in 1896 and in Pensacola, Fla., in 1903, a groundwood and sulfate mill finally went into production at Roanoke Rapids, N.C., in 1909. Today there are 89 mills in operation or under construction in the 12 southern states with a total estimated 1953 daily output capacity of 32,000 tons of pulp, Table I. As can be seen from the map prepared by J. E. Sirrine & Co., which is enclosed in this issue, there is an adequate supply of pulpwood available from new forest growth to sustain the operations of many more mills.

Everyone connected with the pulp and paper industry—whether as a manufacturer of pulp and paper products or as suppliers of manufacturing equipment, raw materials, or chemicals—will be interested in current manufacturing and processing trends that are indicative of the industry's changing character. It is these trends the author is trying to depict and emphasize in this article. No attempt will be made to describe standard equipment or manufacturing processes.

Newsprint production in the South

A trend toward increased activity in the newsprint field is indicated by the establishment of the Southland Paper Mills Inc.'s newsprint mill at Lufkin, Texas, 12 years ago, and the recently completed Coosa River Newsprint Co. mill at Coosa Pines, Ala., which will shortly be supplemented by the output from the Bowaters Southern Paper Corp. mill now under construction in Tennessee. It should be noted, however, that the economical operation of these three mills depends on their favorable geographical location which provides access to cheap power. Thus Southland's mill has access to cheap gas; the Coosa River's mill, a government-operated war plant pur-

The Champion Paper & Fibre Company, Houston, Texas
W. R. Crute, vice president and manager

Chesapeake Corporation of Virginia, West Point, Virginia
Sture G. Olsson, president and general manager

Crossett Paper Mills, Crossett, Arkansas
J. C. Hair, Paper Division manager

Table I*—Estimated 1953 Output Capacity (including that of mills now under construction)

States	Pulp							Total
	Total	Sulfate	Sulfite	Ground wood	Semi chemical	Bagasse	Soda	Paper & Board
Alabama	633,900	478,500		155,400				577,500
Arkansas	315,000	315,000						283,500
Florida	1,516,500	1,414,500	102,000					1,264,500
Georgia	1,620,000	1,530,000			90,000			1,268,100
Louisiana	1,576,500	1,185,000		18,000	178,500	195,000		1,704,000
Mississippi	648,900	184,500		102,000	240,000			717,000
North Carolina	876,000	610,500	39,000		93,000		55,500	391,000
South Carolina	880,200	739,500		900	139,800			910,000
Tennessee	438,600				120,600			434,100
Texas	300,000	195,000		105,000				418,500
Virginia	988,500	511,500		60,000	213,000		93,000	983,700
Totals	9,794,100	7,165,000	141,000	441,300	1,074,900	195,000	148,500	9,152,400

*From the 1953 survey by "The Paper Industry"

chased under favorable conditions, has low coal consumption cost, and Bowater's mill derives its power from the TVA.

The fact that not many mills in the South are as favorably situated from the standpoint of availability of cheap power appears to rule against an immediate and tremendously expanded newsprint industry in that area to meet the U.S. annual requirement of 6,000,000 tons. The three southern mills will have a combined capacity to produce 6 per cent of our total newsprint requirement. Current total newsprint production in the U.S.A. amounts to about 1,000,000 tons.

The reason why availability of cheap power is such a decisive factor in newsprint production, of course, is the fact that a groundwood mill requires considerably more power than is available from process steam requirements. Thus according to information supplied by D. G. Moon, Sirrine Co., a newsprint mill with a daily output of 500 tons requires at least 32,000 kw power for the sole purpose of operating the 4500 hp motors that drive the groundwood grinders. A kraftboard mill using chemical pulp, on the other hand, with the same daily output, requires 12,000 kw power and the generation of 350,000 pounds steam per hour. Moreover, 200,000 of the 350,000 pounds steam required by the kraft mill can be generated from the use of black liquor as fuel and another 50,000 pounds from the burning of bark and other refuse.

However, it is always possible that new processes will be perfected for the manufacture of groundwood pulp for newsprint, which may make this operation less dependent on cheap power availability. Considerable optimism is currently being expressed in the possible adaptation of the semichemical pulping process to newsprint production.

Very promising developments are indicated by the recent announcement that a new process has been developed in Florida for the production of cheap newsprint pulp from sawgrass and that plans have already been laid for the construction of a 40-ton capacity pulp mill at Bells Glade.

It has been estimated that there are about 1,000,000 acres in the Florida Everglades with an average yield of 10 to 15 tons of sawgrass per acre per cutting. Under optimum conditions of growth, sawgrass can yield as much as 50 tons green grass per acre in one cutting; and its rate of growth, which is about one inch per day, assures two to three cuttings annually.

Four tons of green sawgrass will produce one ton of newsprint, and the new process, it is claimed, will make sawgrass pulp the "cheapest pulp thus far developed in the quest for a newsprint replacement material."

Trends in power generation

The trend is toward the generation of higher-pressure steam and higher voltage. High-pressure steam boilers generate power more economically when compared with low-pressure boilers; and it is this development in itself that has made it possible for the southern states to establish an industry on a competitive basis with that of the North, where cheap hydroelectric power is available.

High-pressure steam is delivered to turbine generators where it is extracted at desired pressures for the process requirements in the mill. The chemical pulp and paper mill is normally able to generate 70 per cent of its power from its process steam requirements.

It may be of interest to note in this connection that the highest-pressure steam boiler used in the paper industry is that of Union Bag at Savannah, Ga. This boiler, made by The Babcock & Wilcox Co., develops a pressure of 1,200 psi and delivers 500,000 pounds steam per hour, compared with the combined steam output of 800,000 pounds per hour of 20 other boilers operating at 400 psi at the company's Savannah mill.

In electric power generation, the trend is toward stepped-up voltages—as high as 4160 V—with distribution to load centers, and the use of air-cooled transformers, cubical type switch gear, and air circuit breakers. Motors of 200 hp or over are normally of the synchronous type to assist in power factor correction. Many variable-speed motor applications and electronic controls are found necessary.

A definite trend is the recent introduction of the spreader-stoker in bark-burning boilers. The spreader-stoker embodies the principle of suspension burning and permits the burning of multiple fuels, singly or in combination. The spreader-stoker, with its moving grates that collect and discharge the ash—thus permitting high burning rates per square foot of grate and the handling of highly fluctuating loads—has made an important contribution to power economy. It has improved heat recovery from the conventional 60 per cent to 72 per cent.

Detroit Stoker Co.-made RotoGrate stokers, which are of the spreader-stoker type, will be installed in Babcock & Wilcox boilers at West Virginia Pulp & Paper Co.'s mills at Charleston, S.C., and Covington, Va., International Paper Co.'s Southern Kraft Division at Natchez, Miss., Georgetown, S.C., and Panama City, Fla. These designs include steam generating capacities as high as 325,000 psi per hour. The spreader stoker recently installed at the St. Joe Paper Co. mill is on a 110,000 lbs. per hour steam generating boiler.

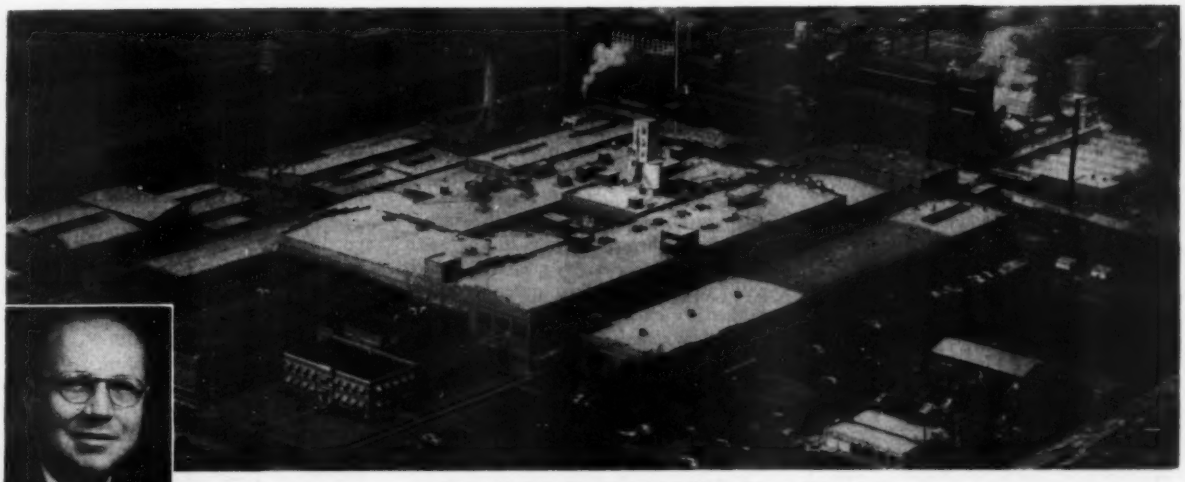
Combustion Engineering Inc. bark-burning boilers with spreader-stokers are now in operation at St. Regis' Jacksonville mill and the Riegel Carolina Corp. mill. A similar unit is being installed at Bowater's mill in Tennessee. The first spreader-stoker in operation in the southern states is a Combustion Engineering unit installed a few years ago at the Chesapeake Corp. mill at West Point, Va.

Wood handling

The trend continues toward greater mechanization. Where topographical and water supply conditions are favorable, a number of mills are introducing the flume system in place of mechanical conveying facilities to move pulpwood from the woodyards to the pulp mill. Flume systems are in use at International's mill at Mobile, Ala., and will also be used at Bowater's mill in Tennessee.

An interesting and novel trend in wood handling is the underwater storage of barked logs. An experimental wood-storage pond is in use at Crossett's Arkansas mill, and an industrial-scale system of underwater storage will be

Gaylord Container Corporation, Bogalusa, Louisiana
Vertrees Young, executive vice president



The Mead Corporation, Kingsport, Tennessee
H. E. Whitaker, president

International Paper Company, Mobile, Alabama
Erling Riis, vice president and general manager

Rayonier Inc., Fernandina, Florida
F. B. Doherty, resident manager

put into operation at Bowater's new Tennessee mill. Here, a cable conveyor —with a vertical figure-eight arrangement—transfers barked logs from the barking drums and dumps them into the center of a pond which has an underwater capacity large enough to accommodate 30,000 cords. The logs will be lifted from the pond by Gantry cranes and placed on a central turn table, where they are picked up on the lower strand of the same cable conveyor and delivered to the wood room on the top strand. In the wood room another turn table rechannels the logs to the chippers or to a flume feeding the grinders.

In barking operations there is a distinct preference for dry methods of barking and the use of longer barking drums. Drums are lengthened by adding a third section adaptable for dry or wet barking.

Trends in pulping operations

The rising costs of pulpwood and chemicals have tasked the ingenuity of mill operators in their search for a better economic balance in pulping operations. To offset the higher costs of raw materials, the trend is toward the adoption of methods that will result in higher pulp yields and a more efficient recovery of chemicals.

In line with this trend, pulp yields in the last three years have increased from the conventional 45 per cent to 60 per cent, and there is evidence that further substantial increases are in sight.

Through adoption of the semichemical pulping process, for instance, a ton of bleached pulp can now be produced from 1.3 cords hardwood, compared with the two cords of pine pulpwood needed to produce a ton of bleached chemical pulp.

Partial conversion to semichemical pulping, say a 25 per cent conversion, appears especially attractive to large sulfate pulp mill operators, since this will enable them to use waste neutral sulfite liquor which otherwise poses a serious problem in stream pollution where semichemical pulping methods alone are practiced. In line with this trend, Union Bag & Paper is now installing a number of digesters for semichemical pulping of hardwoods at the Savannah mill. The installation of the sixth Pusey & Jones paper machine, which will turn out paper from semichemical pulp has just been completed.

Mills which are not making sulfate pulp are considering methods of recovering neutral sulfite liquor from semichemical pulping operations and ship it to interested kraft mills in the form of smelt or brickets.

Continuous alkaline pulping is receiving increased attention. Much effort is being put into the development of commercial continuous alkaline pulping methods at the University of Florida, where pulps of excellent quality and satisfactory yields have been obtained from a variety of woods which were softened at high temperatures, then hammer-milled, and pulped in 15 minutes cooking time.

Bleaching

In bleaching operations the trend is toward the use of chlorine dioxide as a bleaching agent. Compact chlorine dioxide generating units, e.g. the Solvay unit, one of which is in operation at the Riegel Paper Corp. (Acme, N.C.) mill, are now available. International Paper has developed its own chlorine dioxide unit, based on the Rapson process, which is in operation at the Natchez mill. The use of chlorine dioxide permits the replacement of the six stage bleach system with a four-stage system at approximately the same capital investment amounting to about $9,000 per daily ton.

The advantages of the use of chlorine dioxide include higher brightness and improved yield and strength of bleached paper products. This is in line with the general trend of upgrading paper mill products. It also permits the use of high consistency stock in bleaching operations. The possibility of bleaching stocks of 40 per cent consistency is being envisaged, as reported by W. J. Nolan in his article on research activities at Florida University, which appears elsewhere in this issue of THE PAPER INDUSTRY.

The adoption of chlorine dioxide bleaching methods, however, increases maintenance costs appreciably due to the corrosive action of this chemical.

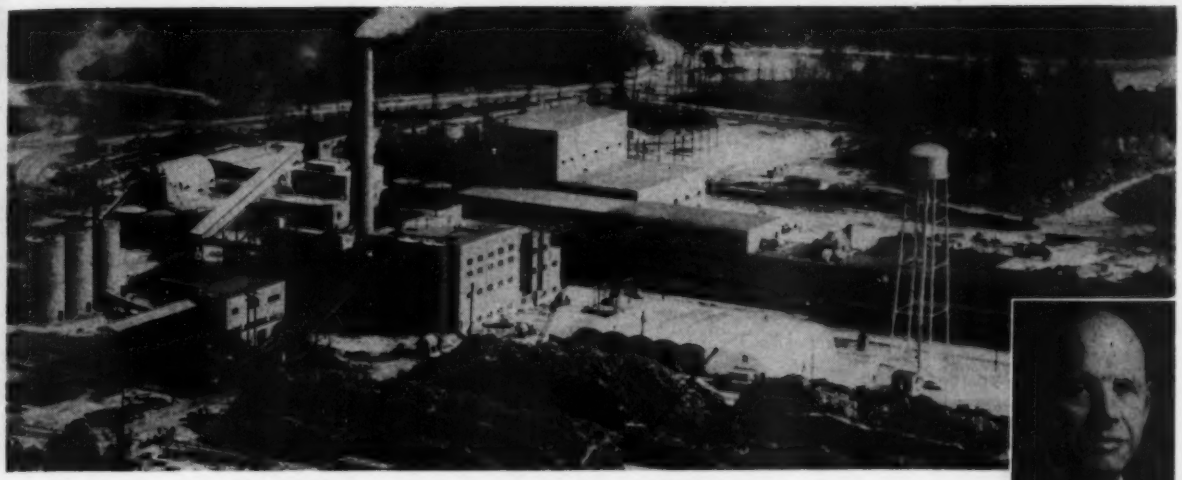
There is also growing interest in bleaching with peroxide, especially for the purpose of brightening semichemical pulps. A brightness similar to that produced from a single-stage hypochlorite bleach has been obtained with as little as 4 per cent sodium peroxide on high-yield pulps.

The major trend toward upgrading all paper grades is partly accomplished through the use of multiple-roll beaters and the availability of high-efficiency rotating-disk-type pulp refining equipment.

Pumps figure high in the pulp-handling operation. Pulps are largely handled in liquid form, and a modern mill has more than 300 pumps in operation that may have a capacity range of 50 gpm to 40,000 gpm. Modern pulp and paper mills invest about 3 per cent of the total equipment cost in pumps of various types.

Paper machines

The basic trend is toward increased production and higher machine speeds. The economy of the entire mill is de-



Riegel Paper Corporation, Acme, North Carolina
J. L. Riegel, board chairman

pendent upon the paper machine running practically without interruption and at maximum capacity to satisfy the demand for more paper. All improvements, which include many drastic changes in machine design have been directed toward achieving this end. The obvious way to achieve increased production is to increase the machine's speed and width.

In line with this trend, paper machine speeds during the period 1946-1950 were increased by 400 fpm, or from 1,600 fpm to 2,000 fpm. With the increases in width and speed a new problem has arisen—that of design and dynamic balance which was relatively unknown a few years ago.

Machines recently put into operation, or now under construction, are designed for speeds of 2,200 to 2,500 fpm and vary in width from 220 to 290 in. Halifax Paper Co.'s New Beloit machine has a wire 246 in. wide and is claimed to be the widest machine in operation in the southern states. In the case of St. Regis' Jacksonville new 2,500 fpm Beloit paper machine, this increase in speed was accomplished at the additional cost of 1 per cent of the cost of a 2,000 fpm machine. Another 2,500 fpm machine, made by Pusey & Jones, also went into operation earlier this year at the Brown Paper Co. mill at Monroe, La.

Guiding 220-290 in. wide wires on a 2,500 fpm machine is a problem, and The Bagley & Sewall Co. has developed a hydraulic guide on its latest models which puts thrust forces of 3,000 pounds and velocities of 24 in. at the disposal of the operator, for purposes of facilitating guiding control.

One of the most important improvements that has made high-speed operation possible is the automatic suction transfer of the sheet from the wire to the couch, which was developed by Beloit Iron Works in cooperation with Crossett Paper Mills.

Other prerequisites to higher machine speeds, of course, are: (1) increased power supply; (2) a greater number of more sensitive control instruments (which now add up to an imposing 300 in a modern mill); (3) tremendously improved sectional drives with herringbone reducers and energized by multiple M-G sets with electronic amplidyne or magnetic amplifier regulation; (4) a well-integrated lubricating system; (5) potentiometric maintenance of sheet tension at the dry end; (6) photoelectric equipment to control felt alignment and squirt actuation in case of sheet breaks; (7) the increased diameter of suction couch rolls, frequently quite out of proportion to a diameter of 54 in.; (8) use of self-aligning roller bearings on all rolls; (9) use of higher steam pressures (up to 125 psi) to increase the drying rate on some paper grades; (10) improved oils with sufficient load carrying capacity to insure bearing protection at these high temperatures, and (11) improved methods of wire changing, e.g. the "rapi-drape" method or other removable fourdrinier section methods which are progressively reducing the time required for this operation.

Accurate stock level in the headbox is now maintained by the use of air pressure, and stock may be fed into the headbox inlet through a "cross flow" distributor to insure more even distribution of fibers. Among additional notable improvements as exemplified by the new 2,000 fpm Pusey & Jones fourdrinier just completed at Union Bag & Paper Corp., Savannah, is the Simplex close-coupled press arrangement and the high-speed, 6,000 fpm, winder—in line with the trend toward improved dynamic balance and higher production speed, respectively.

Other paper machine manufacturers such as Black-Clawson, Downingtown, Rice Barton, Sandy Hill, and Moore & White have accomplished notable improvements in machine design and are supplying specialty machines to the southern pulp and paper industry.

Lubrication

No discussion of trends in pulp and paper manufacturing can be complete without mentioning new developments in lubrication. All machines are now equipped with anti-friction roller bearings, and the lubricants are supplied by way of a completely enclosed automatic Bowser lubricating system equipped with cooling and filtering units.

The lubricants themselves have undergone considerable improvement and oils with anti-oxidant, dispersant, and detergent properties are now available. These improved lubricants are indispensable under modern operating conditions because they:

(1) keep the bearings and gears free from oil oxidation products, water, paper dust, and sludge, by removing them from the machine and carrying them to the filtering tanks where they are separated;

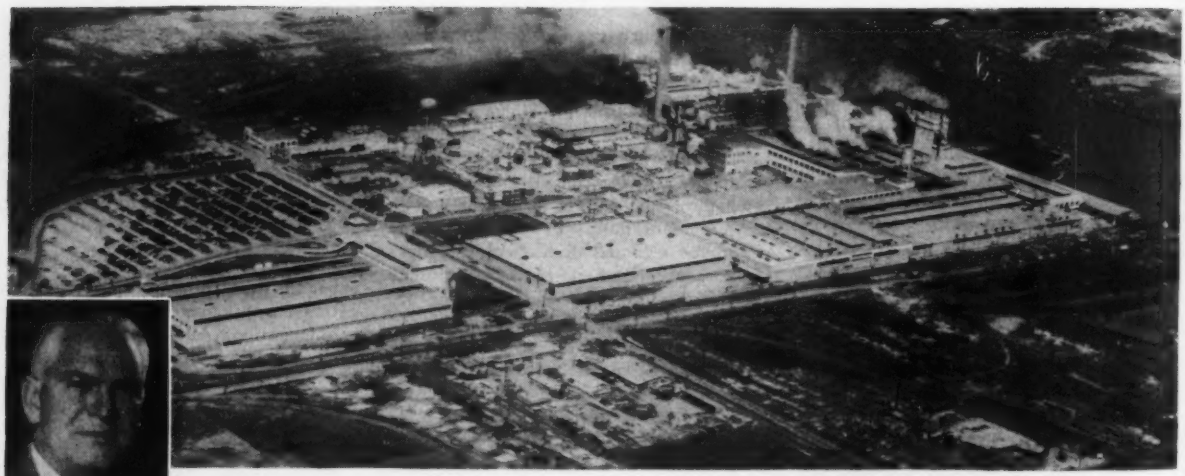
(2) have dispersant characteristics which keep the extraneous material in a fine state of suspension and prevent it from settling out before reaching the filters;

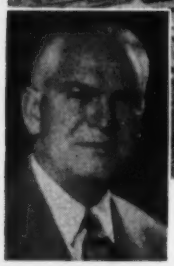
(3) have a very high film strength which gives them a much higher load carrying capacity and withstands the high bearing temperatures (275° F) of the dryer rolls.

Ventilation

Improved ventilation of the process rooms for comfort and cleanliness is another engineering problem which is being satisfactorily solved. The tenden-

St. Regis Paper Company Kraft Center, Pensacola, Florida
Willard E. Hahn, resident general manager





Union Bag & Paper Corporation, Savannah, Georgia
Alexander Calder, president

West Virginia Pulp & Paper Company, Charleston, South Carolina
L. Frank Thompson, resident manager

Table II*—Annual Raw Material Consumption (in tons)

States	Salt Cake	Lime	Alum	Sizing Materials Beater Additives	Acid	Chlorine	Caustic	Sulfur	Soda Ash
Alabama	24,000	35,900	5,300	2,400	1,400	14,900	7,800	700	
Arkansas	18,000	18,000	4,400	1,800	1,200	5,000	2,000	300	
Florida	96,700	127,800	26,300	12,000	6,800	17,600	9,200	2,000	
Georgia	103,000	133,600	16,300	11,000	4,300	17,500	9,000	800	
Louisiana	77,500	98,000	16,100	12,400	4,200	7,200	3,800	2,000	6,400
Mississippi	11,800	20,400	5,400	5,000	1,500	15,200	8,000	10,800	40,500
North Carolina	30,500	41,000	11,000	2,600	2,700	10,000	5,800	1,600	11,100
South Carolina	87,200	70,600	11,000	8,400	2,900			800	3,200
Tennessee			1,000	2,400				1,600	17,000
Texas	10,500	14,000	3,000	5,600	1,100	10,000	5,100	600	
Virginia	50,000	52,000	18,600	16,000	3,300	12,000	6,500	10,600	49,600
TOTALS	479,200	611,300	118,400	79,600	29,600	109,400	57,800	31,800	127,200

*From the 1953 survey by "The Paper Industry"

cy is to entirely enclose the buildings and maintain them under a slight pressure with filtered incoming air. Examples are the Southland Paper Co. mill, the Coosa River newsprint mill, the Crossett Paper mill, the Buckeye Cellulose Corp. mill, and the St. Joe Paper Co. mill, which have been, or are being, equipped with Ross Engineering Co. ventilating equipment featuring air flow capacities of several thousand cubic feet per minute.

There is also considerable interest shown in totally enclosed paper machine hoods, several of which have recently been installed by Ross Engineering in Canadian paper mills, where they are operating very satisfactorily. The completely enclosed paper machine hoods provide such advantages as (1) improved paper quality; (2) appreciable steam saving, and (3) improved working comfort which, of course, is reflected in improved efficiency of operating personnel. Equipment for a completely enclosed paper machine hood has been ordered by Chesapeake Corp., West Point, Va.

Utilization of chemicals

Table II gives an indication of the volume of industrial chemicals used by the pulp and paper industry. These figures are the result of a 1953 survey conducted by THE PAPER INDUSTRY. Unfortunately, these figures must be regarded as approximate only—probably representing low minimum values, due to the general reluctance on the part of the pulp and paper industry to release information on consumption of chemicals. The figures do, however, identify the pulp and paper industry as one of the most important consumers of chemicals.

With the general trend toward diversification and upgrading of pulp and paper products, the quantities and varieties of chemicals consumed are continuously increasing. While rosin, sodium hydroxide, and alum were the first chemicals introduced to the paper manufacturing industry at the beginning of the 19th century, at the half-way mark of the 20th century the pulp and paper industry ranked third as a consumer of chemicals. The fertilizer and textile and rayon industries are the only industries showing higher consumption figures. According to recent estimates, the pulp and paper industry uses 7 per cent of the total titanium dioxide, 36 per cent of the sodium silicate, 38 per cent of the alum, and 29 per cent of the rosin output.

Rosin sizes have undergone continuous modification with a view to imparting better water and ink resistance to the papers. More recently, beater additives have come into prominence. These include a variety of chemicals used to improve strength, wet strength, grease resistance, fire resistance, and fungus resistance.

The trend toward upgrading paper with the aid of beater additives, size press application, or hot melt coatings is undoubtedly going to continue. High quality papers today contain as much as 50 per cent non-fibrous materials, compared with a maximum of 33 per cent only a decade ago.

Today, we use synthetic rubber latices at the annual rate of 16 million pounds for general upgrading purposes of paper; melamine and urea formaldehyde resins at the rate of 15 million pounds for wet strength improvement; polyethylene, cellulose acetate, nylon, saran, and du Pont's latest polyester "mylar" for grease-proofing; chlorophenols for fungus-proofing, and quaternary ammonium compounds for manufacturing paper products with bacteriostatic action; silicone resins for heat stability; alkyd resins, borates, sulfamates, sufonates, and highly chlorinated hydrocarbons for flame-proofing.

Most major manufacturers of chemicals recognize the pulp and paper industry as an important consumer of chemicals by establishing paper chemicals divisions within their organizations for the specific purpose of keeping up with the developments and requirements of the pulp and paper industry. Hercules Powder is an example of a chemical company also supplying specialty equipment, the automatic and compact size-emulsifier, which is becoming quite popular with the southern pulp and paper mills.

A tremendous effort is being made to eliminate all nuisance factors connected with pulp and paper making. A model example is the St. Regis Jacksonville mill, where nearly $1,000,000 has been spent on ways and means to reduce air and stream pollution to a minimum. The major equipment in this program includes two electrostatic precipitators, supplied by Koppers, which have a guaranteed 95 per cent pollutant removal efficiency. Each precipitator is designed to handle individually the mill's total flue gas volume, while the other is kept as a stand-by and ready for immediate hook-up.

Elimination of air and stream pollution

As pointed out by Willis M. Van Horn in the April issue of THE PAPER INDUSTRY, the stream pollution problem from kraft cooking processes is not nearly as great as in the case of the sulfite process. For this reason, in most southern mills the pollution problem is solved by dilution of the waste material or dispersing it through widely separated outlet points into the stream. In others, where the river-flow is subject to variation, as in the case of Camp Mfg. Co. at Franklin, Va., wastes are impounded during periods of low water-flow and discharged during high water-flow. Where the quantities of wastes are excessive, as is the case with Southland Paper at Lufkin, Texas, and Coosa River at Coosa Pines, Ala.—mills which have to cope with a combination of kraft pulp mill, bleach plant, groundwood pulp mill, newsprint machine, and cylinder machine wastes—the solution lies in the construction of settling basins and a number of oxidation ponds.

Considerable interest is also being shown in the possibility of masking pulp mill malodors with chemicals, especially following the promising results obtained at the Champion Paper Co.'s mills at Pasadena, Texas, and at Canton, N.C., where an 80 per cent reduction in malodor is being accomplished through the addition of small quantities of duPont's "Alamask" P-3 to the digesters.

Acknowledgment

The author expresses his thanks and indebtedness to D. G. Moon of J. E. Sirrine Co. for his valuable suggestions and for supplying much of the basic information contained in this article.

Some economic aspects of the development of the paper industry in the South

REAVIS C. SPROULL
ROBERT H. STEVENS
Herty Foundation, Savannah, Georgia

AN ECONOMIC SURVEY should be concerned with basic causes and effects which may not always be evident to a casual observer. These causes and effects are often intermingled with men's ambitions, aspirations, emotions, and prejudices as well as ideological, sociological, and educational development. This has been especially true of the southern region of the United States.

The South in this discussion, unless otherwise indicated, will include the geographical area from the Chesapeake to the Rio Grande and from the Ohio River to the Gulf of Mexico, omitting Kentucky and West Virginia. Specifically, the states included are: Alabama, Arkansas, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Tennessee, Texas, South Carolina and Virginia. The statistics used have been complied from reliable sources. This is a re-evaluation of information available in several fine publications to which the authors are much indebted. No originality is claimed for the basic figures.

The most fundamental *reason for the movement* of the paper industry into the South was the large supply of coniferous wood available and a continuing potential supply due to the mild climate and adequate rainfall, which accelerate the growth of trees and permit year-around logging. Secondary, but of great importance, have been: depletion of wood in other areas of the world, an abundance of willing labor, development of power sources, means of waste disposal, a general dispersal of industry to industrially underdeveloped areas, an abundant supply of water, a development within the area of technology and skilled manufacturing personnel, and a community welcome to industry. At the same time there was a rapidly growing demand for packaging papers. The development of parcel post and uniform merchandising increased the demand for light weight containers, which required the added strength of southern pine kraft. None of these forces should be depreciated as factors, without which the industry would not exist and grow. Growth has been further sustained by favorable employer-employee relations.

When Reaumur and Kellar first postulated and demonstrated that paper could be made from wood, it became almost inevitable that the industry would follow wherever the supply of trees would permit its establishment. The "economy of tree growing" will be a major portion of the economy of papermaking as long as it is easier and less energy-consuming to grow trees than to grow other fibrous raw materials. This does not intend to discredit other materials which will be supplementary sources of paper, but merely emphasizes the role of trees.

When Dr. Charles Holmes Herty and others focused attention on the potentials of southern trees and demonstrated that newsprint groundwood, sulfite, and bleached pulps could be successfully made from southern pine, the future of the paper industry in the South was assured. The primary contribution of these men was in the realm of bridging the gap between the laboratory and large scale manufacturing in spite of prejudices. This required overcoming the reluctance of investors to venture into a new area, where they were not especially welcomed, and the cultivation of a welcome by communities in the South that were suspicious of foreign capital invested in their area. Through pilot plant demonstration and educational persuasion a great industry was transplanted.

Figure 1 and Table III compare the consumption and production of pulpwood, wood pulp and paper for the southern region with the country as a whole and show a calculated trend line based on the history of the industry. The advent of southern pine utilization during the period 1930-40 completely changed the slope of the curves. If the *South's contribution* is subtracted from the nation's total, it can be seen that a disproportionate share of the industry growth has resulted from the use of southern woods. The quantity of pulpwood consumed in the South was about 1½ million cords in 1930 and rose to about 14½ million cords in 1951, with new production already authorized that will require 3½ million cords more by 1956. (Stevenson, *Southern Pulp & Paper Manufacturer*, October 1, 1952.)

The total *forest area* of the South was 211,200,000 acres in 1945. This represents about 33 per cent of the United States total of 623,800,000 acres. Table I shows the distribution of that acreage by states and other general information for calculations the reader might wish to make. Although comprising only 33 per cent of the forest area of the United States, the South distributed 63 per cent of all seedlings. This promises well for the future forests of the area. Dr. Demmon elsewhere in this issue of THE PAPER INDUSTRY presents the forestry picture for Georgia, which is a foremost pulpwood producing state. In principle it typifies the southern region. The nature of the southern forest is well described by Ritchie in "The Forest Resources of the South", *Southern Pulp and Paper Manufacturer*, October 31, 1948. As the region's industries build up and as better forestry is practised, the productive forest area is increasing.

The *growth rate* of pine has been much discussed. It varies widely with location, soil fertility, forest management, rainfall, age of trees, and other local conditions. These factors are more significant than species. A typical study made by the Southern Forest Experiment Station (Planted Pines and Cattle Grazing, 1951), on the growth on cutover land in southwest Louisiana, seems representative of growth with good management and fire protection. At 15 years of age, the slash pine trees averaged 6.1 inches in diameter at breast height and had a merchantable volume of 19.8 cords per acre. Table II shows the growth and values derivable from a complete forestry cycle extrapolated to 65 years for slash pine. Cuttings were made beginning at the end of 15 years and at five-year intervals thereafter. The growth rate was 0,41-0.33 inches in diameter per year decreasing to 0.33 with age. Volume of increase should rise to a maximum during the 55-60 year interval. The average yield per acre per year during the 65 years would be 475 board feet of sawlogs and 0.6 cords of pulpwood, tops, and under sawlog sizes. Under the conditions assumed, the total gross income would be about $1,070 per acre or an average of $14.80 annually for the period.

From these and other data it may be concluded that, with fair management, southern pine should increase in diameter at an average rate of 0.25-0.50 inches per year and yield 0.75-1.50 cords of growth per acre per year.

Magnitude of the Industry in the South

An excellent economic review of the paper industry through 1952 has been

FIG. 1 COMPARISON OF THE SOUTH'S PRODUCTION OF PULPWOOD, WOODPULP AND PAPER WITH U.S. TOTAL

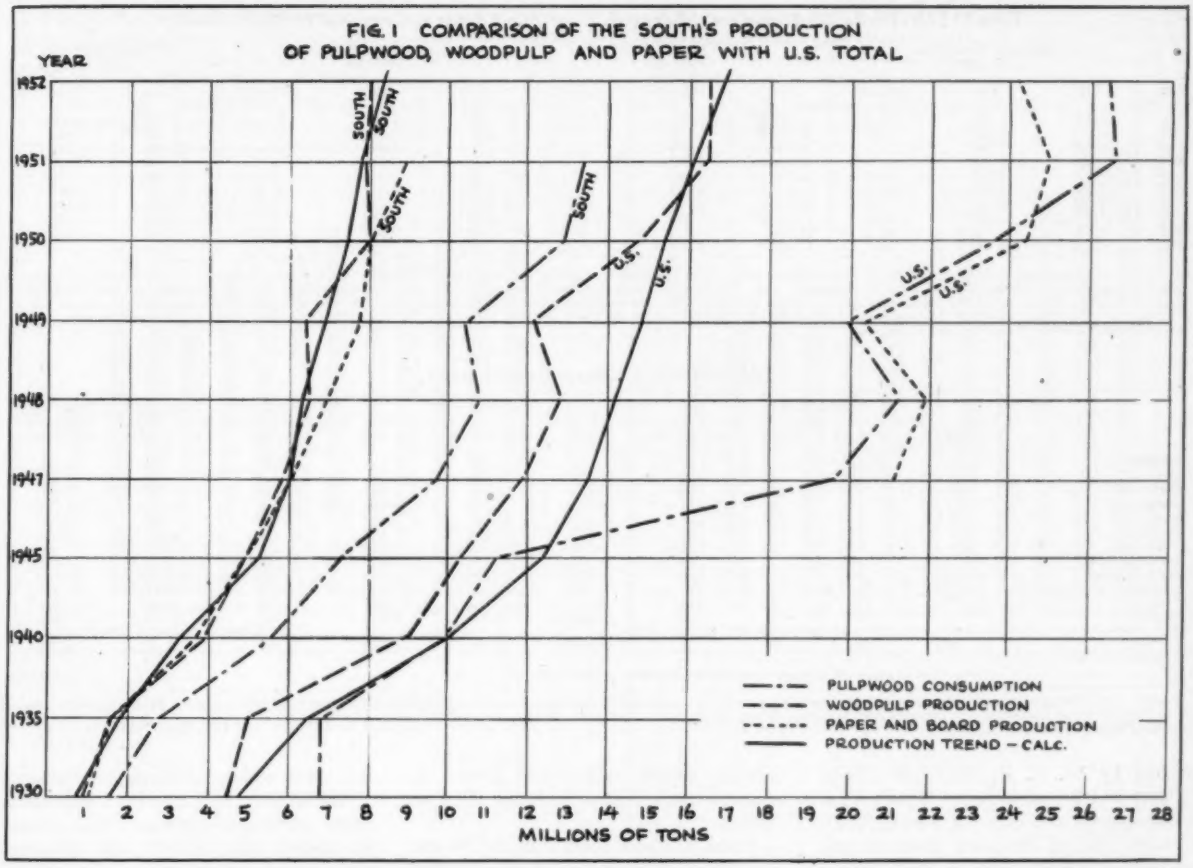


Table I—Land, Population and Forest Data*

	Gross Area Sq. mi.	Population 1950	Per Capita Income $, 1950	Forest Area, 1000 Acres—1945	Seedlings, 1000 Distributed, 1951
Alabama	51,609	3,061,743	836	18,878	15,424
Arkansas	53,104	1,909,511	825	20,036	11,515
Florida	58,560	2,771,305	1,210	23,478	16,525
Georgia	58,876	3,444,578	969	21,432	34,841
Louisiana	48,523	2,683,516	1,045	16,196	37,374
Maryland	10,577	2,343,001	1,547	2,742	1,520
Mississippi	47,716	2,178,914	698	15,889	16,583
North Carolina	52,712	4,061,929	951	18,400	7,949
South Carolina	31,055	2,117,027	831	10,611	19,489
Tennessee	42,244	3,291,718	962	12,165	585
Texas	267,339	7,711,194	1,278	36,553	17,685
Virginia	40,815	3,318,680	1,158	14,832	4,850
Total South	763,130	38,893,116		211,212	184,340
South's per cent of U.S.	26	25		33	63

Land area, U.S., sq. mi.	2,977,128	Forest Area, 1000 acres	623,828
Population U.S., 1950	150,697,361	Total Seedlings, 1000 distributed, U.S. 1951	291,875
Population U.S., 1953 est.	161,000,000	Per capita income U.S., 1950	1,436

*Source: Bureau of the Census—"Statistical Abstract of the United States," 1952.

Table II—Growth, Volume of Slash Pine for a Typical Forest Cycle*

Yrs. after planting	Av. dia. breast high	Av. ann. growth	Value Alternative Products		Volume				Topwood	
						Total				
Yrs.	in.	in.	Pulpwood $	Sawlogs $	Sawlogs & Pulpwood $	(Bd. ft.)	(Cu. ft.)	(Cords)	(Cu. ft.)	(Cords)
15	6.1	0.41	22	...	22	.....	1330	19.8	...	....
20	7.7	0.39	24	...	24	.....	1970	27.0	...	....
25	9.2	0.37	24	...	24	.....	2350	31.3	...	....
30	10.7	0.36	24	15	22	4900	2720	35.3	780	10.8
35	12.2	0.35	23	27	33	7200	3050	38.8	740	9.9
40	13.7	0.34	23	37	42	9600	3360	42.0	670	8.8
45	15.2	0.33	22	52	56	12200	3620	44.4	580	7.6
50	16.7	0.33	21	64	67	14700	3800	45.7	490	6.2
55	18.2	0.33	20	77	79	16800	3910	46.6	410	5.1
60	19.7	0.33	101	459	467	18700	3970	46.7	320	3.9
65	21.2	0.33	44	231	234	6400	1260	14.7	80	1.0
	TOTALS		348	962	1,070					

*Bulletin No. 4, published by Louisiana Forestry Commission.

Table IA—Annual Drain of Commercial Forest, 1944

	South	U.S.	% South
Total (million cu. ft.)			
Softwood	3,703	8,151	47
Hardwood	2,758	5,510	45
Total	6,461	13,661	50
Commodity (million cu. ft.)			
Softwood	3,237	7,348	46
Hardwood	2,362	4,834	44
Total	5,589	12,182	49
Commodity by product (per cent)			
Pulpwood	10	11	
Softwoods	17	16	
Hardwoods	2	3	
Calculated Pulpwood (million cu. ft.)			
All timber	559	1,340	
Softwoods	500	1,176	
Hardwoods	59	145	
Calculated Pulpwood per cent of total			
All timber	8.7	9.8	
Softwoods	14.7	14.4	
Hardwoods	1.7	2.6	
By destructive agencies (million cu. ft.)			
All timber	872	1,479	59
Softwoods	476	803	59
Hardwoods	396	676	59
Calculated pulpwood as per cent of destructive	64	90	

Growth vs. Drain (Million Cu. Ft.)

All timber growth	6,391	13,370	
All drain	6,461	13,661	
Drain per cent of growth	101	102	
Softwoods growth	3,520	6,756	
Drain softwoods	3,703	8,151	
Drain per cent of growth	105	121	
Hardwoods growth	2,871	6,614	
Drain hardwood	2,758	5,510	
Drain per cent of growth	96	83	

Table III (A)—The South's Production of Pulpwood, Wood Pulp & Paper as Compared With U. S. Total

Year	Pulpwood Consumption (000 cords)			Wood Pulp Production (000 tons)			Paper & Board Production (000 tons)			Production Trend	
	U.S.	South	% South	U.S.	South	% South	U.S.	South	% South	U.S.	South
1930	6,800	1,600	....	4,500 BC	850 C	48.2	.....	1,000 C	....	4,800	600
1935	6,800	2,800	....	5,000 BC	1,600 C	....	.....	1,700 C	....	6,500	1,850
1940	10,000	5,600	....	9,000 BC	3,800 C	....	.....	3,200 C	....	10,000	3,300
1945	11,200	7,300	....	10,500 BC	4,900 C	....	.....	4,900 C	....	12,500	5,200
1947	19,714	9,687	49.1	11,946 A	5,760	48.2	21,114	5,970	28.3	13,500	6,000
1948	21,189	10,812	51.0	12,872 A	6,531	50.7	21,897	6,958	31.8	14,200	6,400
1949	19,945	10,519	52.7	12,207 A	6,300	51.6	20,315	6,657	32.8	14,900	6,900
1950	23,627	12,901	54.6	14,849 A	8,030	54.1	24,377	7,986	32.8	15,500	7,400
1951	26,576	12,844 F	54.1	16,520 A	8,880	53.8	26,086	8,925	34.2	16,500	7,800
1952	26,462 F	13,381 F	50.7	16,467 F	8,886 E	54.0	24,413 F	.....	.....	.....	.....

A—Growth and Importance of the Southern Pulp and Paper Industry, by Dr. Louis T. Stevenson. B—Future Expansion of Pulp Production, by Charles H. Boyce. C—Estimated. D—American Paper and Pulp Association Monthly Statistical Summary. Note: The Southern Region includes all pulp mills which are located in the states of Texas, Arkansas, Louisiana, Mississippi, Alabama, Florida, Georgia (except the northeastern tip), South Carolina (except the three western counties), North Carolina (except the western quarter of the state), and the eastern half o Virginia. E—"The Paper Industry's" Survey—personal correspondence. F—Pulp, Paper and Board, Industry Report, Vol. XI, March 1953, United States Department of Commerce. Area covered slightly different than other areas of this table.

Table IV—Pulp and Paper Data by States

	Number of Mills				Employees—1951			Pulpwood Production(4) 1951 (000 cords)	Paper and Board Production tons 1951(5)	Wood Pulp Production tons 1952(6)
	Paper(1)	Board(1)	Pulp(1)	New Planned	Total(2)	Productive(2)	Woods(3)			
Alabama	5	2	7	0	4,582	3,955	5,270	1,406	500	584
Arkansas	3	0	2	0	1,886	1,620	2,300	614	240	251
Florida	3	7	8	3	6,887	5,945	5,585	1,490	1,270	1,805
Georgia	3	7	5	5	4,851	4,188	8,883	2,370	1,030	1,568
Louisiana	5	5	9	1	13,972	12,060	4,164	1,111	1,860	1,220
Maryland	3	6	1	0	4,861	4,195	656	175	322	N.A.
Mississippi	1	4	6	0	5,840	5,041	6,721	1,793	324	650
North Carolina	5	4	5	0	6,855	5,919	4,889	1,305	370	693
South Carolina	0	3	4	0	2,875	2,481	4,688	1,251	1,005	889
Tennessee	5	5	6	1	3,061	2,642	717	191	334	405
Texas	6	1	4	1	3,317	2,864	4,341	1,158	400	218
Virginia	6	6	11	2	9,333	8,055	4,971	1,326	870	885
Total	45	50	68	12	68,320	58,974	53,185	14,190	8,925	8,168
Grand total all paper and board products, 1952, (Maryland omitted) tons										8,340,250

Sources: (1) Lockwood Directory. (2) Bureau of Labor Statistics—prorated by American Pulp and Paper Association. (3) Department of Agriculture Forest Service, 1950, prorated by American Pulp and Paper Association. (4) Department of Agriculture Forest Service, 1951. (5) Bureau of Census, prorated by American Pulp and Paper Association. (6) Survey by "The Paper Industry"—private communications.

made by W. L. R. Neubrech (Pulp, Paper and Board, Industry Report, U. S. Department of Commerce, Vol. 9, No. 1, March 1953). The forest resources and economic background of pulp, paper, and paperboard are well covered by Ritchie and Stevenson (*Southern Pulp and Paper Manufacturer,* October 31, 1948; October 1, 1952). Data from several sources will not balance perfectly because of slight variations in calculations.

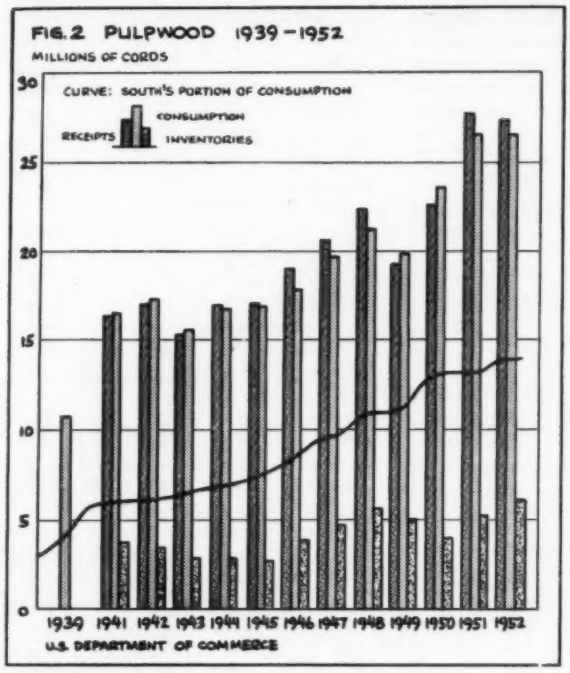
Total receipts of pulpwood for 1952 was 27,358,000 cords, and total consumption was 26,462,000 cords (National Production Authority, Pulp, Paper and Board, Industry Report Vol. 9, No. 1, 1953), of which about 51 per cent consumed was provided by the South. Wood pulp production totaled 16,467,000 tons, 54 per cent of which was produced in the South. Pulpwood consumption in the South in 1952 exceeded that of 1951, although less for that year in all other regions except the Pacific Northwest. The largest growth in pulp has been in sulfate, which has increased from 4.7 million tons in 1942 to 8.6 million tons in 1952. Most of this was in the South. The trend in purchased wood pulp continues downward as integration of forestry, pulping, and papermaking proceeds. The South's part in the national pulp and paper picture is best compared by reference to Figs. 2 and 3. A very limited quantity of waste fibers is used in the South. The pulp industry represents the only major industry consuming timber which has shown a marked upward growth during the last decade.

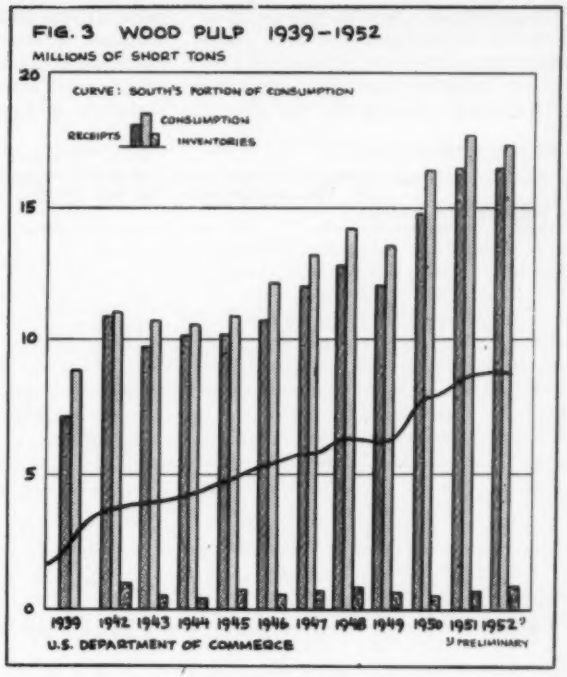
There has been some concern for the *total drain* on our forest resources. Table IA contains data selected from Ritchie's article comparing the drain in the South with that of the United States. In 1944 the total drain was 13,661 million cubic feet, 50 per cent of which was from the South. Of that amount 1,340 million cubic feet, was for pulpwood. In the South 559 million cubic feet, or 8.5 per cent, was for pulpwood. It is estimated that this has increased to 13.6 per cent in 1952. The total drain in the South exceeded the growth by 1 per cent, compared to 2 per cent for the nation. The South's pulpwood cut (559 million cubic feet) was less than the destructive drain (872 million cubic feet). For softwoods, the South over-cut by 5 per cent, whereas the nation as a whole over-cut 21 per cent. In every category the South is protecting its future for pulpwood as well as, or better than, the nation as a whole.

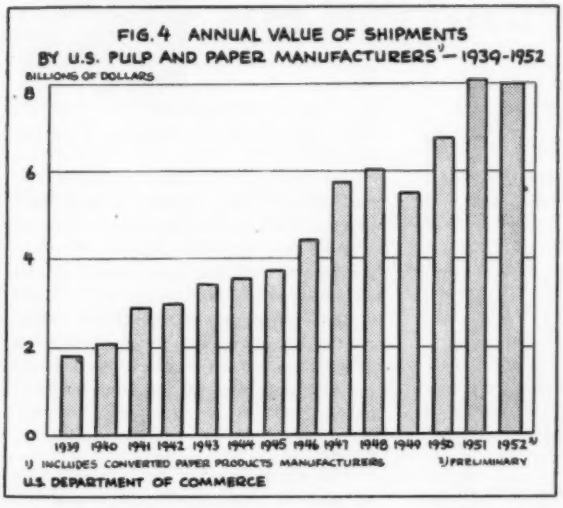
If the cast-offs from lumber production—which remains the largest single use for trees—and culled trees can be used, pulp production from trees can steadily increase without additional drain on the forest resources. On the other hand, if an annual growth of 0.5 cords per acre is assumed, the potential new supply is 105 million cords in the South alone, almost all of which would be accessible. As better forestry is practised, this growth can be increased to 150 million cords within the foreseeable future.

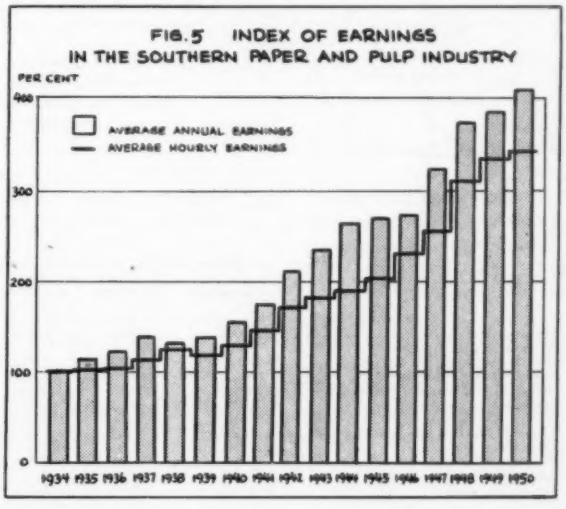
Although in 1952 the total pulp and paper production declined about 6 per cent below that of 1951, the industry sales were 8 billion dollars. Fig. 4 (bar graph in N.P.A. report, page 5, of March 1953) shows the value of products from 1939 to 1952. The sales of the southern pulp and paper industry were over 2 billion dollars in 1951. In that year the number of wage earners in the paper industry was 420,000. They received wages of $1,436 millions. When the per capita income is considered, this supported 1,000,000 people. Of that number, about 120,000 were employed in the South and received about $400,000,000 in wages and salaries. The index of earnings for the industry has steadily risen, as shown in Fig. 5.

Distribution of producing units, with new ones planned, is shown in Table IV. There were a total of 68 mills in 1951, which should increase in number to about 80 in 1955. Accessibility to water, good transportation and means for waste disposal have placed a large number of these along the southern coast. It is reasonable to expect that the products manufactured will become more diversified, that pulpwood consumption and paper-paperboard production in the South will reach a plateau at 55-60 per cent of the nation's total and be distributed roughly according to availability of wood. The largest producers are Georgia, Florida, Louisiana and South Carolina, all favorably located with respect to a continuous supply of wood.









Effect on the Economy

The importance of the southern pulp and paper industry to the nation is widely understood, its value to the region has been less widely proclaimed. By 1951 over $1,800,000,000 had been invested in the southern mills. When mills now in construction and expanding are completed, the investment will be well over 2 billion dollars. More than 120,000 employees get their livelihood directly from the industry, with about 600,000 directly dependent on it. Trees, as pulp and paper, are now a close competitor with cotton in the region's economy.

Table V shows the investment and income from all industry as compared with the paper industry. Total new investment for plant equipment for the three select years 1947, 1949, 1950 was 16 billion dollars, of that amount about one billion, or 6 per cent, was by the paper and allied products industry; of that total an estimate of $500 million was in the South. Certificates of necessity reported over a period January 1951 to June 1952 allowed $346 million for expansion of the industry in the South out of a total of $480 million for the whole country. Asuming that the certificate represents 50 per cent of the gross investment, the total to be invested in the area would be $692 million.

As shown in Table VI, a select group of industries in the South Atlantic states which are important to the South are compared with respect to value added by manufacture per employee and annual wage. The paper industry is second only to chemical products in value added per employee. It is of such big groups as textiles, clay, and lumber products and fourth with respect to annual income per employee. The paper and chemical industries have grown together as the demand for basic chemicals such as soda ash, chlorine, salt cake, and alum has risen.

The general potential effect of the paper industry is further seen by a comparison of the individual income in all manufacturing with that in the paper industry for seven major pulp and paper producing states. Representative data are shown in Table VII. The annual individual pay received in the paper industry in the South is from 14 per cent, in Tennessee, to 50 per cent, in Mississippi, more than the average of all manufacturing. In Georgia, the hourly wage was $0.27 per hour above the all manufacturing average.

Figure 6 shows how the per capita income of the southern area has steadily risen with the growth of the paper industry. Sales of paper products totaled 2,219 million dollars for the area in 1951, (The Blue Book of Southern Progress, 1952). The South's share of savings and loans has increased from 12 per cent in 1945 to about 15 per cent in 1951, (U. S. Savings and Loan League, "Annual Statistical Reports"). Total savings in the United States for 1951 were $19,173 million, the South's $2,856 million. The general improvement is best seen when converted to common dollars as shown for Georgia in Table VIII (Industrial Survey of Georgia, Georgia State Chamber of Commerce).

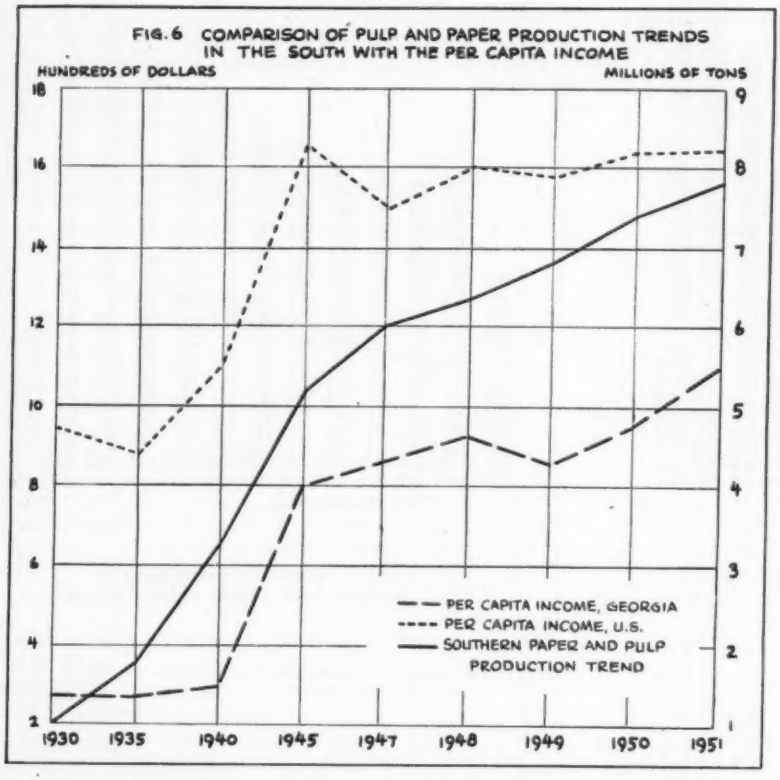


Table V—Investment and Income

	Year	$ (000,000)	% U.S. Total	Hourly Wage Georgia 1952*
Income All Industries	1950	239,170		
Income Paper & Paper Products	1950	2,656	1.1	
Expenditures for Plants & Equip. in U.S.	1947 1949 1950	6,004 5,067 5,110		
Expenditures for Paper & Allied Products	1947 1949 1950	407 315 299	6.7 6.2 5.9	
All Manufacturing Durable Goods Paper & Allied Products				$1.21 $1.20 $1.48

Source: Statistical Abstracts of the U.S., 1952. *Industrial Survey of Georgia, Georgia State Chamber of Commerce.

The South's manufacturing output is now expanding at a rate 20 per cent greater than that of the country as a whole; since 1939 it has increased 110 per cent, while the rest of the United States increased 90 per cent. At present, the South has about 22 per cent of the total manufacturing output of the nation (The Blue Book of Southern Progress, 1952).

The quantitative contributions of any particular industry cannot be established, but the role of pulp and paper has been a major one, greater than its proportionate part of the total manufacturing. All elements of the economy have shown marked improvement. Never before has an industry, because of the use of a new source of raw material, moved so rapidly and changed so completely in character.

Table VI—Income & Value Added by Manufacture—1950

	Total $ for Group (000's)	Number of Employees	Total $ Wages (000's)	Value Added/Emp.	Income $/Employee
Chemicals & Allied Products	1126040	106536	343713	10569	3226
Petroleum & Coal Products	38701	6541	21961	5917	3358
PAPER & ALLIED PRODUCTS	425346	49672	158220	8563	3185
Food & Kindred Products	760605	145075	343409	5242	2367
Lumber & Products (except furniture)	529564	187205	294306	2828	1572
Electrical Machinery	118216	18564	61925	6368	3336
Printing & Publishing	274450	49589	164128	5937	3309
Stone, Clay & Glass Products	346670	68042	182098	5095	2676
Textile Mills Products	2108790	497201	1233798	4241	2481
Furniture & Fixtures	235873	58016	134596	4066	2319
Apparel & Related Products	373792	112311	227058	3337	2022
Region, All Products	8445606	1592612	4060110	5303	2549

Calculated from: Statistical Abstracts of the U.S.—1952. Table 929, p. 779. States: Delaware, Maryland, District of Columbia, West Virginia, North Carolina, South Carolina, Georgia, Florida.

Table VII—Per Employee Income*$

	All Manufacturing			Paper Industry			Paper Industry Per cent of all Manufacturing
	1929	1939	1947	1929	1939	1947	
Alabama	972	887	2,157	.....	900	2,551	118
Florida	962	884	2,146	.....	1,168	2,726	126
Georgia	819	803	1,938	1,005	1,114	2,627	135
Mississippi	914	701	1,796	.....	.....	2,692	150
North Carolina	878	838	1,989	1,036	1,317	2,973	149
South Carolina	755	758	1,999	.....	1,101	2,706	135
Tennessee	1,050	983	2,137	1,286	1,217	2,447	114

Source: United States Department of Commerce.

Table VIII—Comparison of 1951 with 1939 for Georgia

Classifications	Active Establishments	Persons Engaged	Sales or Receipts $ Million	1951 % Increase Over 1939 in 1939 Dollars
Manufacturing	6,600	300,000	3,711	138
Construction	4,600	72,000	594	337
Utilities	2,600	76,000	601	144
Finance & Real Estate	4,300	32,000	397	98
Wholesale Trade	3,900	51,000	3,496	88
Retail Trade	35,100	174,000	2,470	72
Service Trade	15,000	100,000	468	46
Mining	100	4,000	34	88
Other	200	4,000	12	150

Future

The paper industry has a higher rate of growth than any other major industry of its age. Planned southern capacity for 1955 is 11,500,000 tons of pulp and paper. Planned capacity for that year is about 15 per cent above the curve of normal growth. The Paley Report indicates an expected production by 1975 of 28,800,000 tons of woodpulp and 45,000,000 tons of paper and paperboard. The South's ultimate portion of the total should be about 16,000,000 tons of each.

With good forest management added, the same basic reasons which brought the paper industry to the South will assure its future. A sound system of tree farming, the stepped-up rate of planting seedlings, the development of an awareness of the value of trees and a stable market during dull periods for agricultural products, will lead the small landowners to sustained yield practices.

Still needed to supplement this system is a basis for financing the tree farmer, improvement in utilization of all trees, a legal structure to assure sound business practices and tax structures.

These are being developed by such institutions as the forestry schools, the universities and engineering colleges. Notable plans have been formulated at North Carolina State College of Forestry, University of Florida, the Southeastern Law Center at Mercer University and elsewhere to find solutions to various phases of the remaining problems.

The system of fire control, education at all levels, and cooperation developing among wood-using industries and public agencies will protect the growing trees. A means of financing the "tree farmers" will encourage the owners to wait until their trees reach economical cutting age.

More and more integration of use through voluntary cooperation, such as among farmers, foresters, sawmill operators and pulpwood users will result in more complete utilization of the trees, and a wider variety of products.

The utilization of hardwoods, which now accounts for more than 15 per cent of the total pulpwood consumption, continues to be one of the outstanding developments and will expand until an economic forestry balance is attained.

For applications not requiring the qualities of low-yield pulps, semichemical pulps will replace low-yield kraft, and a wider variety of species will be utilized. As the population continues to shift and more is known about the fine papermaking properties of southern woods, papers of lower yield but relatively higher market value will be made.

For specialized uses, agricultural residue or waste fibers will be developed. Notable examples are bagasse and sawgrass. The volume of these will not materially affect the quantity of wood consumed.

Should a depression come, the southern mills would likely be the last affected because of their integration with supply of raw material, low inventory costs for pulpwood and pulp, and modern construction contributing to high yield and low cost production.

Development of the chemical industry, population shifts and population growth will supplement the growth of the industry in the South.

Unless some disaster befalls the area's trees there will be adequate wood for use of all wood-using industries in the foreseeable future.

Wood pulp from woods and mill residues*

H. R. JOSEPHSON
Chief, Division of Forest Economics
U. S. Forest Service

DURING THE PAST DECADE the wood requirements of pulp mills in the United States have steadily increased by an average of about 1,000,000 cords annually, to a 1951 peak of nearly 27,000,000 cords. In the southern states alone pulpwood consumption rose from about 7,000,000 cords in 1941 to about 14,000,000 cords in 1951, or an average increase of 635,000 cords annually. During the same period wood requirements of northern pulp mills increased by about 140,000 cords annually and western pulp mills by about 135,000 cords.

These expanding needs for pulpwood have been met primarily by a larger cut of softwood "growing stock," i.e., trees currently and prospectively suitable for lumber as well as products such as pulpwood. At the same time, however, there has been a rapid increase of the use of logging residues, cull trees, and mill residues that were formerly wasted.

Comparison of regional practices

According to the best figures currently available from the Forest Survey and a few case studies, about 84 per cent of the 14,000,000 cords of pulpwood cut in the South in 1951 was produced from growing stock (Chart I). Production from growing stock included 10,600,000 cords of pine pulpwood and 1,300,000 cords of hardwoods. About 1,000,000 cords of pine pulpwood, or about 8 per cent of the total pine pulpwood cut in the South in 1951, were derived from logging residues such as tops and miscut logs left after cutting of sawlogs and veneer logs. A little more than 800,000 cords of pine pulpwood were cut from cull trees, and about 300,000 cords of hardwood pulpwood came from cull trees, or, combined, 8 per cent of the pulpwood cut. Only about 20,000 cords of pine pulpwood were obtained from mill residues in 1951. However, the use of mill waste in the South is expected to increase rapidly as a result of the current or prospective installation of log barkers and chippers at a number of southern sawmills. (See article on barkers elsewhere in this issue of THE PAPER INDUSTRY.)

Use of mill residues in the South has not kept pace with developments in the West, where growing stock provided only 70 per cent of the 4,600,000 cords of softwood pulpwood cut in 1951 (Chart II). The use of chips from mill residues has grown spectacularly in the Pacific Northwest. In 1951 about 1,000,000 cords of material formerly wasted at sawmills and veneer mills in this region were converted into pulp, together with about 400,000 cords of cull trees and other logging leftovers formerly wasted.

In the Northeast and Lake States regions about 95 per cent of the 4,300,000 cords of softwood pulpwood and the 2,200,000 cords of hardwood pulpwood cut in 1951 came from growing stock (Chart III), with relatively small quantities derived from logging residues and cull trees.

This rapid increase in use of woods and mill residues in many parts of the United States reflects the fact that available supplies of timber have not kept pace with the increasing demands for the preferred softwood species. Higher stumpage prices, as well as growing problems of pulpwood procurement, have directly affected the economics of utilizing logging and mill residues. These changes in economic conditions, coupled with the development of improved log barkers and other equipment, has greatly stimulated use of a readily available wood resource that has largely been wasted. Interest in use of woods and mill residues seems likely to increase much further, moreover, in view of the continuing expansion of the pulp and paper industry, and the increasing difficulties of meeting pulpwood requirements from the preferred softwood timber resources alone.

In the long run the pulp and paper industry undoubtedly must continue to place its primary reliance upon growing timber crops, with emphasis upon growing desired species in economic locations.

* This paper is based largely on a discussion of the use of woods and mill residues for pulpwood, which was presented at the annual meeting of the American Pulpwood Association in New York, N. Y., February 18, 1953.

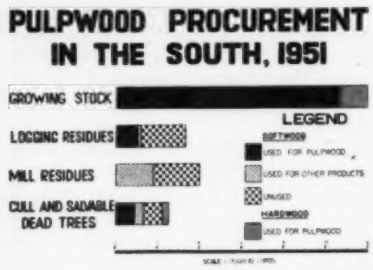


Chart I

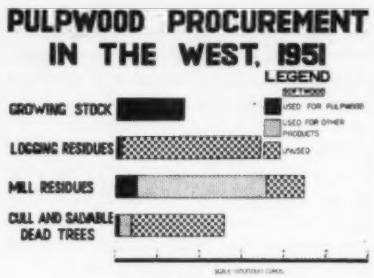


Chart II

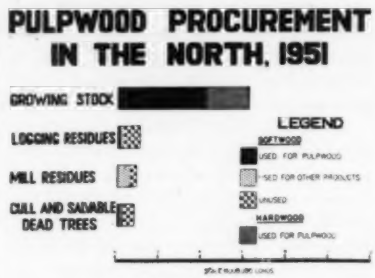


Chart III

Nevertheless, the pulp and paper industry can further augment its raw material supplies substantially and almost immediately by greater use of residues.

Logging residues

In the South pine logging waste currently unutilized totals approximately 2,000,000 cords annually (Chart I). As indicated previously, utilization of logging residues for pulpwood has increased to significant levels in recent years, both through integrated operations whereby pulpwood is removed along with sawlogs or other products, and through post-logging operations which cut pulpwood from tops and other parts of leftover trees. While logging residues are much less than in prior years, they obviously still represent considerable volumes of wood suitable for pulping.

Unfortunately large portions of the logging residues created annually in the South are widely scattered over literally thousands of small operations. Recent studies in South Carolina conducted by the Southeastern Forest Experiment Station show that most of the pine logging residues occur in concentrations of 1 to 2 cords per acre, with only about a fourth of the total residues occurring in volumes of more than 2 cords per acre. There are also significant variations in location and accessibility of logging residues which influence their value and the feasibility of utilization.

Sawmill residues

An additional 2,000,000 cords of chippable pine residues are also left unused each year at southern sawmills. Studies by Carpenter (1) and King (2) indicate that on the average close to half a cord of material suitable for chipping is produced per thousand board feet of lumber cut. This ratio varied from about 0.4 cords at the larger and better equipped sawmills to more than 0.6 cords per thousand board feet cut at small portable mills. Utilization of this chippable waste varies widely. At many of the larger mills a major part of the mill residues is used for mill fuel or sold for domestic use, or is used in remanufactured products. On the other hand, at numerous small portable operations where gasoline or diesel power is used, there is little or no utilization of the chippable residues produced. It is also possible that a portion of the pine mill residues used for purposes other than pulpwood in the South, amounting to about 1,700,000 cords annually, could be made available for pulp through substitution of other sources of power and heat, or through greater efficiency in the use of material burned at sawmills for power and steam.

In addition to logging and mill residues, there are substantial volumes of softwood cull trees standing in southern forests that are unsuitable for sawlogs. The removal of these trees would substantially enlarge the industry's pulpwood resource base and at the same time lead to an increase in timber growth. If these cull trees were liquidated over a 15-year period, for example, at least 1,000,000 more cords of pine pulpwood could be produced annually.

Hardwood mill residues

Altogether, the unused mill and woods residues suitable for pulpwood thus amount to more than 5,000,000 cords annually in the South alone, without allowance for possible use as pulpwood of some of the residues used for fuel and other products. Similar chippable softwood residues in the North are estimated at about 1,600,000 cords annually, and in the West at about 12,600,000 cords.

In addition to softwoods, large volumes of hardwood logging and mill residues and hardwood cull trees are likewise available throughout the eastern United States. No detailed estimates are presented for such hardwood residues, since hardwood timber resources are more than adequate to meet the imminent needs of the pulpwood industry. Like woods and mill residues, however, hardwoods represent an unused resource of tremendous potential importance to the pulp and paper industry. The use of hardwoods has been steadily increasing for a growing number of paper and paperboard products. New processes and new technology are pointing the way toward a great expansion in use by the pulp industry of this relatively low cost and neglected pulpwood resource.

Varied cost considerations

Expansion in the use of logging and mill residues is of course influenced by many varied cost considerations. Closer utilization of tops, for example, or concentrations of sawmill slabs from many small sawmill settings, will undoubtedly involve higher costs than exist on conventional logging operations. On the other hand, the "stumpage" or raw material costs of such waste materials are relatively low. No precise estimate can be made as to how much of the large reservoir of the unused chippable wood can be economically utilized for pulp this year, or five or 10 years hence. However, the economic feasibility of using wood or mill waste has already been proved in varied situations. In the South the best opportunities for utilizing additional residues appear to be at the 300 or more sawmlls which individually produce more than 5,000,000 board feet of lumber annually. There are also about 2,500 small sawmlls each producing from 1,000,000 to 5,000,000 board feet annually, with a byproduct of chippable waste varying from 500 to 2,500 cords per year. On these logging operations pulpwood can be produced through integrated logging and closer utilization.

Increasing the use of residues at sawmills and on logging operations will of course require new investments in debarkers, chippers, and other equipment. New technologies for handling and shipping woods and mill residues will be needed. Possibly a new system of pulpwood procurement must be developed. Such problems have already been met in many cases, particularly at large sawmills in the West and at a few installations in the South. Undoubtedly there are many opportunities for further profitable expansion in use of woods and mill residues for pulpwood, both in the South and in other forest regions of the country.

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2. King, W. W., Survey of Sawmill Residues in East Texas, Technical Paper No. 3, Forest Products Department (Texas Forest Service), 1952.

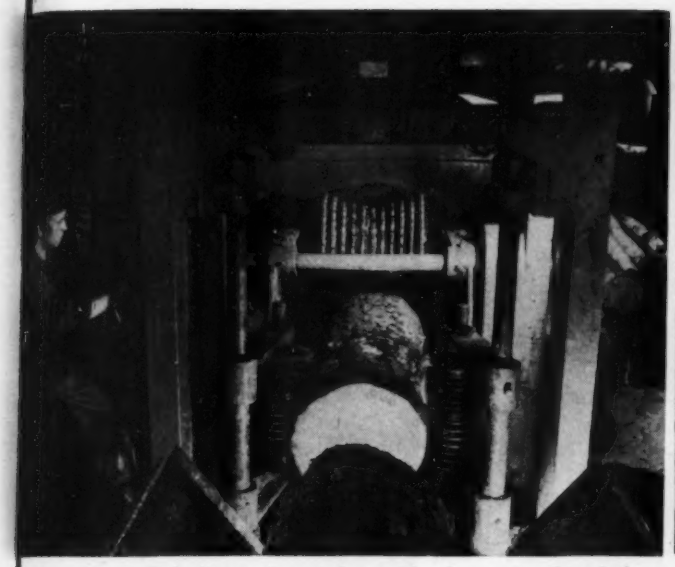


Fig. 1—Debarking equipment shown with a log moving through the machine; another log follows immediately behind; logs up to 26 in. in diameter can be handled

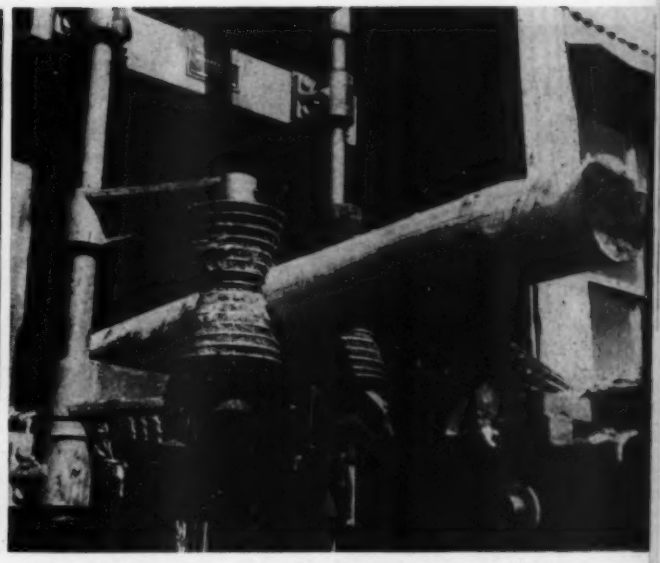


Fig. 2—Debarker removes bark by abrasive action and without any wood loss; above, a pine log emerges from the equipment; bark is completely removed.

New barking equipment and methods permit utilization of sawmill waste*

THE INSTALLATION OF 26-inch Andersson barkers at Chapman, Ala., by W. T. Smith Lumber Co. and at Warren, Ark., by Southern Lumber Co. marks the beginning of a new pulpwood procuring practice in the southern states. W. T. Smith supplies St. Regis Paper Co., while Southern supplies Crossett Paper Mills with chipped sawmill waste.

By the end of 1953 some 15 additional 26-inch Andersson barkers are expected to be in operation in the southern states. Ten of these units will be used by a single company.

W. T. Smith has a capacity to cut approximately 36,000,000 board feet of lumber each year at its Chapman mill. With the Andersson barker in operation, this cut yields sufficient debarked slabs to provide St. Regis with a quantity of chips equal to 18,000 cords of pulpwood. At least 0.5 cords of chips can be produced from each 1,000 feet of pine. The average cut of the Chapman mill is about 12,000 ft. per hour.

In 1951 the southern pulp mills used 13,984,000 cords of pulpwood. Indications are that total pulpwood drain in the South may soon exceed 17,000,000 cords annually, and reliable estimates show that a total of 4,056,000 cords of pine wood waste can be made available annually to the southern pulp and paper manufacturing industry.

The operation of mechanical barking equipment by the sawmills presents three major advantages: (1) an additional source of income through the sale of chips; (2) a decreased drain on pulpwood in any particular area, and (3) clean debarked logs, which reduce saw maintenance by about 30 per cent.

How the barker operates

The Andersson barker (Figs. 1-5), manufactured by Soderhamn Machine Mfg. Co. of Sweden, is a compact 30 hp machine. By means of a number of adjustable tools set in a revolving ring, it scrapes off the bark by abrasive action without damaging the wood itself. The round-edged tools which move around the log are deflected individually and follow the contour of each log without wood loss, so that straight, crooked, and knotty logs can be debarked with the same efficiency.

The company makes two types of barkers. Both types incorporate the principle of rotary tool ring from which three to 12 stelite-tipped tools are forced against the log. The stationary type, or semi-portable model, utilizes compressed air to force the tools against the log. When air pressure is released, the tools are retracted to the rotating ring under the action of centrifugal force. The portable type makes use of the action of centrifugal force upon adjustable counter-weights and springs to press the tools against the log.

The operator discharges one log at a time by foot-pedal control of the transfer conveyor to the infeed live-roll table, which feeds the log into the barker. This table is capable of pivoting in a vertical plane. As the log passes between horizontal live-feed rolls, it is clamped into position by application of pneumatic pressure. With the log firmly secured by the horizontal live-feed rolls and the vertical dead-guide rolls, the level to which the infeed live roll table is raised or lowered is governed by controls affected by log diameter as determined by the distance between the vertical guide rolls.

The instant the log enters the tool ring, the operator applies pneumatic pressure to his controls, which force the eight tools against the log. With the tools rotating at a high rpm and the log moving forward, the bark is peeled from the log, leaving a spiral-shaped pattern on the cambium layer. The blunt ends of the tools are unable to penetrate to the wood fiber.

Feed to the machine may be stopped, reversed, or run at a faster or slower speed, depending on what difficulties are encountered in barking operations.

The results of a test at Crossett obtained from composite samples of chips collected daily for three consecutive days indicate a 0.4 per cent bark content

*Compiled largely from information presented at the annual meeting of the American Pulpwood Association at the Waldorf Astoria Hotel, New York, N.Y., in February, and also from A. P. A. progress reports.

Fig. 3—New long-handling system closely coordinated with debarkers at W. T. Smith; after being marked, log moves to circular saw in the metal structure (background)

Fig. 4—Chip screen dropping pine chips onto conveyor belt; to the right of the main conveyor is a smaller one for removing sawdust and chips too small for use

Fig. 5—Portable "slinger" throwing chips into the end of boxcar; chips are gravity-fed into the slinger from a conveyor belt leading from the chip screen

of the chips manufactured by Southern Lumber. This bears out the fact that bark removal by the Andersson barker is quite satisfactory when used in conjunction with a chipper and screening operation.

The slabs collected in the sawmill are conveyed to the chipping house, where they are fed into a chipper and cut into chips approximately one inch square and about 3/16 inch thick.

The chips are then blown to a rapidly vibrating chip screen. Knives of the chipper are protected against possible damage by a metal detector which automatically shuts off the conveyor after a metallic object is spotted among the chips.

The cost of Andersson barkers

The cost of installation of a 26-inch Andersson barker is $27,000 to $28,000, which would seem to limit this operation to lumber mills that maintain production of 75,000 to 100,000 board feet per day.

However, Soderhamn has now developed a small semi-portable barker which can be supplied at a cost not exceeding $6,000 and which is designed for mills producing 15,000 board feet per day. Figures show that more than 75 per cent of the timber in the southern states is sawn by mills producing less than 15,000 board feet per day.

The following table lists the specifications and prices for some machines manufactured by Soderhamn, f.o.b. Birmingham, Ala. Prices include all motors, switches, controls, and air compressors. Spare parts are available from Talladega, Ala.

Specifications and Prices—Debarker*

Type A	Price	No. of Tools	Log Max.	Diam. Min.	Min. Log Length	Motor HP	Max. Feed Speeds FPM	Net Wt. in Tons,	Air Comp. PSI	Air Comp. CFT Min.
16"	$21,800	6	16"	2"	4'	20	120	3	100	50
20"	25,100	8	20"	4"	6'	25	120	4	100	50
26"	28,700	8	26"	5"	6'	30	90	5	100	50
30"		12	30"	8"	6'	35	90	8	100	50
Type B										
12" L	$12,000	3	12"	3"	4'	12	60	2.5 1.0 Trailer		

*From A.P.A. Progress Report No. 110.

Soderhamn also has a self-opening type portable barker which costs about $10,000, has a maximum feed-speed of 120 ft. per minute, and is designed for smaller diameter logs up to 12 in.

Soderhamn further makes the new Carpenter barker, priced at $2,800 and capable of handling 4-ft. pulpwood logs. It is designed for use by wood contractors.

A low-cost sawmill barker, costing about $4,000 and designed for use on southern pines, is another type recently demonstrated by the company.

The model CX-90 chip screen, rated at a capacity of 12.5 to 13.5 cords of chips per hour, sells for $8,640.

The model HF-60 forced-feed four-knife chipper—especially adapted to the manufacture of chips from sawmill waste because pressure rolls firmly grasp the slabs as they are fed into the 75-inch disc—is listed at $12,060 f.o.b. Birmingham.

Of interest is a typical breakdown of electrical power requirements for all additional equipment installed to make the conversion of sawmill waste into chips possible:

Debarker	40 hp
Chipper	110 hp
Screens	10 hp
Conveyor	40 hp
Total	200 hp

Debarking by air aspiration

Before an effective separation of bark by this method can be made, the woody material is reduced to a uniform size. Chip cards, slivers, knots, and oversize material are broken down, and the bark is knocked loose from the chips and granulated or reduced in size.

In the course of developing a satisfactory aspiration barker, The Bauer Bros. Co. modified a conventional slow-speed impact breaker for the special requirements of this application. The machine operates at slow speed, 450 to 900 rpm, and has very heavy swing drubbers and grate bars. The heavy drubbers throw the material against the impact breaker section and reduce the material to a point where it will pass through the widely spaced grate bars.

The bark separation is accomplished on a double deck shaker screen equipped with an air aspiration hood. The chips are fed uniformly to the top shaker deck, which is equipped with a fairly coarse screen plate. On the lower deck the fine material, which is mainly bark and sawdust, drops through the fine screens. The fraction remaining on the screen is segregated by the screen action, with chips finally floating to the top to be removed by the air aspiration hood. The material passing the aspirator hood on the screen deck is predominantly bark.

Figure 6 shows the flow diagram of bark removal by the aspiration method, as presented by L. Eberhardt of Bauer Bros. The horsepower requirements of a system handling an 8-hour output of 100 tons are as follows:

Bark drubber	50 hp
Shaker aspirator	15 hp
Cyclone collectors	75 hp
Conveyors, feeders, etc.	15 hp

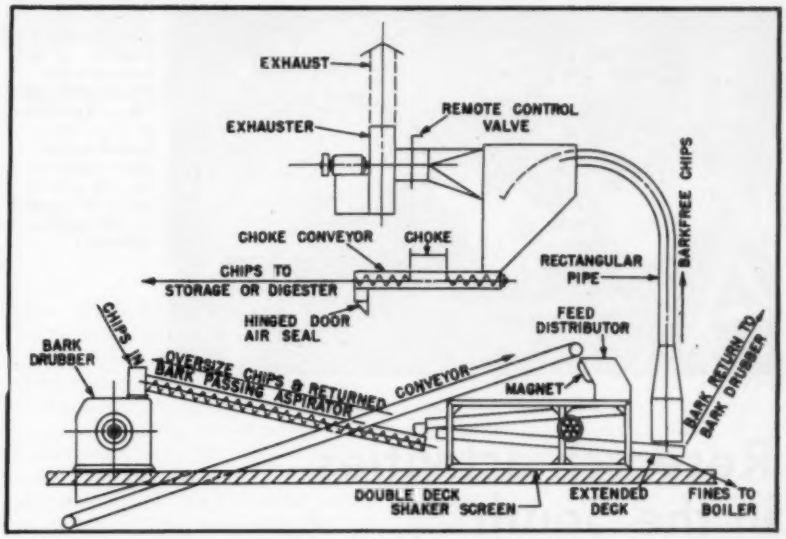


Fig. 6—Flow diagram of bark removal by the aspiration method, as presented by L. Eberhardt of Bauer Bros.

Slab barkers

While the opinion prevails in some quarters that no satisfactory economical, small-scale slab barker can be developed —as indicated by the inadequate performance of various slab barker types such as the cutter head type; the fixed and oscillating nozzle hydraulic slab barker; the drum barker, and numerous beater-head types—both West Virginia Pulp & Paper Co. and the Carthage Machine Co. feel that it is possible to develop an efficient, small-scale slab barker that can justify itself in economical performance.

Both companies have conducted extensive experiments with slab barking equipment — mainly beater-chains, brushes, and hammers. Their conclusion is that the hammer-type slab barker is the only one that shows definite possibilities. West Virginia Pulp & Paper is now in the process of constructing and developing a small-scale slab barker for use some time in the near future. Details of construction of this barker, of course, are not available at this stage. Carthage Machine reports favorable results from the use of sickle-shaped, blunt-ended hammers which make use of centrifugal force during the process of bark removal. This company has successfully peeled slabs at rates up to 130 ft. per minute.

Among the factors that seem to rule against the satisfactory operation of a slab barker are: (1) the practically unsurmountable difficulty of removing bark from edgings; (2) the barkers' performance, which is limited to a large degree by the shape, form, and size of the individual slab; (3) the difficulty of achieving the high production rate required to process the estimated large volumes of slabs to be handled; (4) the bark disposal problem, which must be considered when operating a barker at some concentration point other than the pulp or saw mill.

Chemical debarking

Methods of chemical debarking have been tried on southern pines and hardwoods in the southern states. The best method is to remove a ring of bark about 4 in. wide at a convenient height of the tree and paint the exposed area of wood liberally with sodium arsenite solution.

A number of factors must be considered for satisfactory chemical debarking operations.

(1) *Time of the year.* The best time is during the normal sap peeling season when the bark is loose and can be girdled easily. At this time the upward movement of food and water is also at its height.

(2) *Temperature at time of treatment.* Temperature is not as important a factor as it is in the North, but experiments have shown that no satisfactory peeling takes place when the chemical is applied at wood temperatures below 65° F. Below this temperature, movement of water and chemicals in the tree is slowed down considerably. It has also been shown that a breeze during the chemical treatment is quite effective, since it increases the transpiration rate and causes the chemical to be moved upward at a faster rate, thus killing the whole tree in a matter of three to seven days. The faster a tree is killed, the better it will peel.

(3) *Weather conditions after treatment.* Evidence shows that if rain comes during the first 24 to 48 hours after the treatment, some of the chemical is washed away from the girdled area and the treatment is rendered less effective.

(4) *The best chemical.* The results of extensive experiments have shown that a 40 per cent sodium arsenite solution, to which has been added one pound of Indulin B per gallon, gives the best and quickest kill and most uniform and satisfactory peeling results. Indulin B, a by-product of the southern pulp industry, acts as an adhesive holding the sodium arsenite to the exposed girdle until it is absorbed by the tree.

The following conclusions based on the results of a two-year-old experiment were made by D. W. Sowers, West Virginia Pulp & Paper:

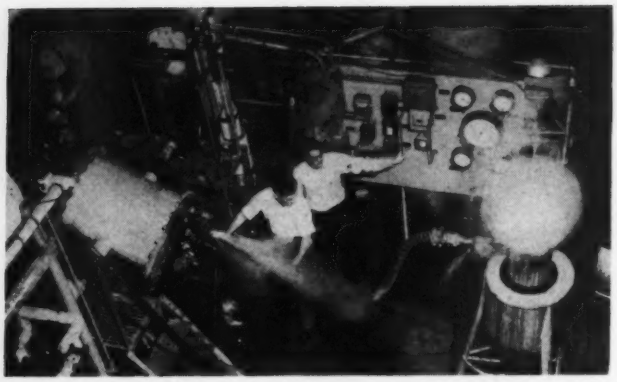
(1) Pines and oaks react favorably to chemical treatment. Bark removal is as easy, if not much easier, than during normal sap peeling.

(2) It is best to treat pines toward the end of the peeling season, or during the second peeling season in September.

(3) The chemical treatment is not recommended for red gums, because these trees deteriorate too fast after treatment.

(4) It is not necessary to girdle some species to achieve good results. It is faster, and just as effective, to cut frills through the bark in a ring around the trunk and pour the chemical into the groove.

According to results obtained at Syracuse, the chemical cannot cause injury or death to animals 48 hours after its application to the trees. There is also good evidence that the addition of small amounts of creosote to the sodium arsenite solution will repel animals that might otherwise be interested in licking the painted area.



One of seven experimental digesters at the University of Florida; the unit whose capacity is ½ cu. ft., is housed in the steam jacket at the left and is being discharged at full cooking pressure

Research activities in the South

THE SOUTH IS RAPIDLY developing its own research facilities to cope with the numerous and unique problems arising from its varied and fast growing forest resources, their utilization, and the phenomenal growth of its pulp and paper industry.

In this issue we are presenting a special article dealing with important accomplishments and current work in pulp and paper research at the University of Florida, as described by Dr. W. J. Nolan.

A further indication of the scope of other research activities in the South is shown by the following brief description of facilities at the Herty Foundation Laboratory, North Carolina State College, Georgia Institute of Technology, and Alabama Polytechnic Institute. Also in line with this trend is the well-integrated model research center of International Paper Co. recently opened at Mobile, Ala.

The Herty Foundation

The Savannah Pulp and Paper Laboratory, Savannah, Ga., became the Herty Foundation in early 1938, and the assets —mainly equipment—formerly held by the Chemical Foundation were given to the new foundation. It is a trusteeship of the State of Georgia but not a branch of the state government. Some funds are obtained from the Georgia Division of Forestry. These are primarily used to improve the facilities to perform laboratory services.

The broad objective of the Herty Foundation is to uncover and apply research results for the development of new or improved industry to utilize trees, agricultural products, farm and industrial residues. Integrated utilization of all portions of the forest resources is a primary aim.

To accomplish this objective the Laboratory cooperates with other institutions with similar goals and engages in work toward solution of a wide variety of problems sponsored by individual companies. It is especially well equipped for studies requiring the use of pulp and paper pilot plant equipment. Much of its work is confidential in nature and is disclosed only with the approval of the client.

During 1952 about 40 projects were undertaken and 30 completed. The areas of emphasis were: utilization of bagasse and other annual crops for pulp and paper, culled hardwood utilization, methods of fiber refining, methods for obtaining high yields of pulp by semi-chemical processes. As a result of studies in which Herty participated, three new plants have been announced for the United States in 1953. These will utilize bagasse, waste paper, and sawgrass for making pulp and paper. Several others involving use of culled wood, bagasse, and wood waste are in less tangible stages of planning. It is always the aim of the Laboratory to obtain practical results in a minimum of research and development time.

The Foundation operates a completely equipped pilot plant. Small-scale equipment is also available and is used for developing new ideas to the pilot plant stage and for quality control on the pilot studies.

North Carolina State College

The Forestry Division of North Carolina State College has just been granted an appropriation of $200,000 by the state legislature in recognition of the importance of the pulp and paper industry to the state economy and in view of the inadequacy of regional facilities for the training of a sufficient number of technical men employed by this industry.

In accordance with the need for industrial education, the School of Forestry at State College, directed by C. E. Libby, has organized for this year a four-year undergraduate curriculum in pulp and paper manufacture. As announced by Professor Libby, this new curriculum, initiated in cooperation with a group of large southern paper mills, "is designed to train men for technical positions inside the mills where a fundamental knowledge of wood technology, cellulose and fiber chemistry, elementary chemical engineering, and a speaking and working knowledge of the theory and operation of the pulp and paper manufacturing processes themselves are the principal requirements for employment."

To give an indication of the inadequate supply of technically trained men in the pulp and paper field, the New York State College of Forestry at Syracuse usually has more than 100 paper mill jobs available each spring for its normal graduating class of 25. In the course of a single academic year, Syracuse has been asked to recommend its graduates to fill more than 500 positions in the pulp and paper industry.

Currently, our schools graduate annually a total of approximately 50 men who are trained in papermaking, while it is estimated that the industry could easily absorb 1,000 such men annually.

Georgia Institute of Technology

Georgia Tech is actively engaged in cellulose research and is at the present time setting up a viscose laboratory which will house a small pilot plant. A project has just been completed which involved an analysis of the use of bamboo for making paper. This analysis is being followed up by an experimental project at the Herty Foundation in Savannah. Sponsorship of both projects lies with the Bureau of Plant Industry.

Other work at Georgia Tech has involved coatings and finishes for papers and work on the structure of kaolins.

Alabama Polytechnic Institute

The Forestry Department at the Alabama Polytechnical Institute, although not actively engaged in research in the field of pulp and paper, carries on research in the field of wood chemistry, including pulp. The current research project in this field carries a tentative title, "Chemical Changes in Wood with Advancing Decay."

The Institute has a completely equipped wood chemistry laboratory with all standard facilities for studying the physical and chemical properties of wood.

In accordance with the Institute's operation as a department of forestry, research, in so far as possible, is tied in with wood production. One example of this is the study of correlation of cellulose yield with species and density of stand, which has led to the conclusion that loblolly pine in 19 years will produce an average annual yield of 2,200 pounds of extractable cellulose.

Pulp and paper research at the University of Florida

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University of Florida

RESEARCH IN THE FIELD of pulp and paper has been going on at the University of Florida since 1946. The program was given its original impetus by the evergrowing problem of the utilization of scrub oak, so prevalent in Florida and throughout the South. The Pulp and Paper Laboratory is one of the many branches of the Engineering and Industrial Experiment Station and operates as an integral part of the Chemical Engineering Department of the university's College of Engineering.

The first problem undertaken was that of how best to use the wood of the scrub oaks in the paper industry. Contrary to previous published information, it was found that turkey oak could be pulped very satisfactorily by the sulfate process. A very good grade of short-fibered filler pulp was produced in yields of 46 to 48 per cent, requiring only 6 to 7 per cent chlorine for a fully bleached pulp. Chemical requirements of the pulping operation were less than those required by slash pine. These oak pulps were found comparable in all respects to the filler pulps largely imported from Canada for the manufacture of book and bond grades of paper.

Bark separation

Parallel to this research on pulping, another project on the separation of the oak bark from its wood was being carried on. One of the principal deterrents to the use of hardwoods in the manufacture of bleached pulps has been the contamination of the chips with appreciable quantities of bark. The scrub oaks were considered to be among the worst offenders in this respect, since the bark of this species is particularly heavy.

First experiments in this field involved the chipping of the bark-covered oak logs, depending on the shattering action of the chipper knives to break the bond between bark and wood. The mixture of bark and wood chips was then passed over an air-floatation table, which separates materials by their differences in specific gravity. Thus far, this method of separation has not been too successful because it has been found that the difference in density between bark and wood is not the only variable which affects the separation on the table. Another variable, which might be called shape factor, has a very pronounced effect which tends to counteract the difference in density. The wood chips are comparatively thin and flat and the upward stream of air on the table gives them a certain buoyancy. Bark particles, on the other hand, are relatively thick and rounded and are not so readily affected by the airstream. Therefore, separation is not as effective as would be expected from a consideration of difference in density alone. It is planned to continue this investigation, but results to date do not indicate that separation by density difference alone is the solution of the problem. Other methods of bark removal are also being studied.

Continuous alkaline pulping

About four years ago studies were inaugurated aimed at continuous alkaline pulping. It was recognized that any successful continuous process must be rapid —in the neighborhood of 30 minutes reaction time—if pulping equipment is to be kept reasonably simple and commercially practical. It was further recognized that high-speed pulping reactions would require sustained concentration of cooking chemical and rather high temperatures. From this starting point, a great deal of new information concerning the alkaline pulping reaction has been brought out and a process capable of producing a fully cooked pulp in 15 minutes reaction time has been developed.

First, it has been found that full-size mill chips cannot be pulped satisfactorily at very high reaction rates. Such chips, when exposed to liquors of constant concentration at high temperature, will be severely overcooked on the surface while chip centers are still untouched by the reaction. Yields from such chips are too low for economical operatiton, and screenings contents of the pulps are high. However, it was found that, if these chips are treated mechanically in such a manner that wood surface area is tremendously increased before cooking, pulps of very good yield and low screenings content can be produced in very short cooking times.

New theory of reaction mechanism

This discovery led to a new theory of reaction mechanism in alkaline pulping. Previously, the diffusion mechanism was supposed to control the pulping reaction—possibly a carryover from the older sulfite pulping process. In sulfite pulping, this diffusion theory undoubtedly is valid since the cooking chemical is present in both the gas and liquid phases. Here, SO_2 gas diffuses into the wood ahead of the calcium base in the liquid phase and temperature must be kept low until the liquid phase has penetrated into the chip. Thus, serious burning of the pulp by the acid gas is avoided. Hence there is a long period at the start of the cook to allow diffusion of the liquor into the chip before the temperature is raised for the pulping reaction to proceed at appreciable rates.

However, in alkaline pulping, all chemical is present in the liquid phase and there is no need to allow the liquid chemical to penetrate before the reaction starts. In fact, evidence compiled in this laboratory shows that the reaction starts as soon as liquor comes in contact with the wood. In a normal commercial cook, about three-quarters of the chemical has been consumed and over 40 per cent of the wood has been dissolved during the so-called "diffusion" period while the digester is being brought to full steam pressure.

These and other facts show that the reaction is one which takes place at a liquor-wood interface before the liquor itself has had a chance to penetrate into the whole chip. This liquor-wood interface penetrates toward the center of the chip, the chemical opening up channels through the chip by dissolution of lignin. Since the alkaline liquors will attack cellulose as well as lignin, extreme care must be exercised in the handling of the cooking variables to insure maximum delignification with minimum degradation of cellulose.

Since all evidence points to a surface reaction, the only logical conclusion is that maximum wood surface should be developed before the chips are introduced into the digester. However, mechanical disintegration of the green chips, while increasing wood surface, may defeat its original purpose by tearing apart a high percentage of cellulose fibers and may make the resultant pulp unsuited for papermaking purposes. While avoiding chemical degradation of cellulose, careless treatment of the chip may well result in mechanical degradation. It has

been found in this laboratory that mechanical treatment which takes advantage of the physical weakness of the chip due to its grainy structure will split the chip along the grain and avoid breaking of the wood across the grain. Such treatment does practically no damage to the cellulose fibers themselves.

It therefore develops that there is an optimum point to which the chips should be reduced in size. Actual fibrillation of the chips before cooking will break too many fibers even though the maximum of surface has been developed. It has been found in this laboratory that, if chips are split along the grain so that cross-section at right angles to the grain is less than the openings in a 4-mesh screen but larger than the openings in an 8-mesh screen, very rapid reaction rates may be employed without appreciable chemical degradation of the cellulose. These reduced wood sections can be kept just as long in the grain direction as the original full-size chip. Such "matchstick" or "toothpick" chips, when cooked under identical conditions to those used for full-size chips, produce pulps of equal or greater tearing strength, indicating no fiber damage during the mechanical treatment.

It becomes apparent, in the light of the above facts, that very drastic pulping conditions can be successfully employed if time of exposure to these conditions is made sufficiently short. The overall reaction must be made sufficiently uniform so that the cellulose fibers in the outer portions of the wood particle do not lose all of their protective lignin sheath before the inner fibers are purified. The longer the elapsed time between the delignification of the outer and inner fibers, the greater will be the degradation of cellulose and consequent loss in yield and strength of the resultant pulps.

New methods for dissolving grades pulps

In the course of all these pulping experiments at various constant concentrations, a hitherto unknown relationship between pentosan content of pulps and concentration of cooking liquors was discovered. If a wood, either hardwood or conifer, is cooked with liquors containing about 80 gm. Na_2O per liter, the pentosan content of the pulp will be about 2-3 per cent. Lower concentrations of alkali in the cooking liquor result in higher concentrations of pentosan or hemicellulose in the pulp. This fact opened up a new field for the sulfate process, namely, the production of dissolving grade pulps.

Heretofore, the sulfate process had to be preceded by an acid hydrolysis of the chips if the resultant pulps were to be used for xanthation, acetylation, etc. The standard sulfate process, characterized by falling liquor concentration during the cook, always results in pulps of high pentosan, or hemicellulose, content. Such high pentosan pulps are undesirable for dissolving grades, hence the need for acid prehydrolysis to remove the pentosan. Acid prehydrolysis with subsequent sulfate pulping produces a chemically satisfactory pulp for dissolving purposes but yields of pulp are low, seldom exceeding 35-38 per cent of the original dry wood. By the use of continuous methods, with sustained concentration of about 80 gm. per liter, dissolving grades of hardwood pulps of 40-42 per cent screened yield and containing 94-95 per cent alpha cellulose can be produced in 15 minutes cooking time.

Wide scope of application

This same process, employing lower concentrations, has produced pulps of 46-48 per cent screened yield from slash pine, with strength properties and bleachabilities comparable to the best grades of kraft pulps. The uniformity of such pulps (a characteristic of all pulps produced in this manner) eliminates the need for blending tanks, so commonly used to smooth out the inequality of pulps (a characteristic of present commercial pulps).

These continuous pulping methods are particularly adapted to the cooking of bagasse, bamboo, and similar cellulosic materials. Here, the presteaming and mechanical pretreatment are unnecessary since nature has provided the required open structure. Pulps of papermaking quality with over 50 per cent yield and dissolving grades of over 40 per cent yield have been produced from these raw materials in cooking times as short as 5 minutes.

Chip-size reduction

All of the above points for the production of chemical pulps apply equally well in the field of semichemical pulping. It is this particular phase of continuous pulping which this laboratory is now studying. In present commercial practice, semichemical cycles are rather long when batch type digesters are used, but are quite short, in the neighborhood of 30 minutes, when continuous equipment such as the Chemi-pulper or Medura Cooker are used. Yields are very high, 70-85 per cent, indicating only a slight degree of cooking. It is unavoidable that full-size chips, subjected to these conditions, will have entirely different characteristics near the surface of the chips when compared to the chip centers. These non-uniform chips, passed through the attrition mill for fibrillation, will suffer considerable fiber damage and the power consumption will be needlessly high. The relatively soft outer portions of the chip will be readily reduced to fiber but, unfortunately, will stay in the mill as long as the hard chip centers and will be subjected to needless tearing action from the mill plates. The chip centers, being insufficiently softened, will suffer considerable fiber damage because of the excessive shear required for fibrillation of the incompletely softened material.

In this laboratory's continuous process, the surface of the chip is tremendously expanded prior to cooking, insuring uniform reaction throughout the wood particle in very short cooking time. It is estimated that a semichemical cook, requiring 5-10 minutes, will produce a uniformly softened material. Such cooks will not employ constant chemical concentration but will involve controlled decrease in concentration with cooking time. The resultant material, being uniform, will suffer the minimum of fiber damage during fibrillation and will consume less power than will standard size mill chips.

Another point comes up for consideration if one is planning on producing a bleached semichemical pulp. Here, the advantage of the uniformly cooked fibers is obvious. Pulps from full-size chips will require a great deal more bleach and the fibers from the outside of the chip will be severely overbleached because of the time and concentration of bleach required by the raw fibers from the chip centers.

The production of semichemical pulps involves the problem of pure mechanical size reduction as much as that of chemical purification. Rarely does one find a mechanical subdivision process involving size reduction from material as large as wood chips to particles of fiber size with only one pass through a single mill. Efficient practice, from the point of view of power consumption and uniformity of product, usually calls for the use of two or more stages of size reduction, generally involving the use of mills of different type. Why should semichemical pulps be reduced completely over such a wide size range in one pass through an attrition mill? It would seem more logical to partially reduce chip size prior to cooking, taking advantage of grain structure weakness; then complete the reduction after the material is uniformly softened. It is hoped that present studies along this line will produce stronger fibers with less power consumption.

A pilot plant to prove the commercial application of continuous methods for the production of both chemical and semichemical pulp has been designed and some of the necessary equipment has already been obtained. This plant will be capable of producing pulp at the rate of 3 tons of chemical pulp or 5-6 tons of semichemical pulp per 24 hours. Several equipment manufacturers have

cooperated generously through the loan or outright gift of processing equipment. The complete plant cannot be put in operation until sufficient funds have been accumulated to defray the installation and operating costs of such unusually large-scale operations.

Bleaching of high consistency stock

A new development in the field of pulp bleaching is also under investigation here. Equipment has been installed by one of the large machinery manufacturers which makes it possible to carry out bleaching operations at very high density. Such bleaching densities may run as high as 40 per cent dry fiber. The original idea of such processing was not developed in this laboratory but the possibilities of the idea are being studied here. With the difficulty of uniform blending of bleaching agents into pulps at such high density overcome by the processing equipment being used, the possibilities of increased concentration of bleaching agents and the accompanying decrease in bleaching time can be evaluated. The same principle involving the application of drastic conditions of concentration and temperature at greatly reduced reaction time, found to apply so successfully in alkaline pulping, may apply equally well in bleaching reactions. These studies are being carried out on a large scale, it being possible to produce bleached pulp in quantities large enough for paper machine runs.

Other investigations

The application of the hardwoods in the manufacture of corrugated medium is under detailed study and, upon completion, will be published. These hardwoods, so plentiful in the South, are being used to a limited extent in the production of corrugated medium but the advantages of such woods in this field are not generally known. It is expected that the improvements in the stiffness and other properties of corrugated medium from semichemical hardwood pulps will be evaluated. Both standard batch methods and continuous semichemical pulping methods are being used.

The analytical section of the laboratory is being expanded to include the evaluation of dissolving grades of pulp for xanthation and acetylation processes. Heretofore, research on the production of dissolving pulps has been seriously hampered by the time lag and differences of opinion encountered when the pulps are evaluated by industrial consumers of such pulps. The laboratory is now determining the dissolving qualities of the pulps as they are produced, thus making possible a much broader field of investigation.

The laboratory is being used more and more by pulp and paper manufacturers and designers as a development laboratory for the uses of unusual species of cellulosic materials and for the solution of specific processing problems. The pulping equipment is extremely flexible, permitting the study of either batch or continuous methods. At present it is possible to produce pulps in quantities as small as 150 gm. or as large as 50-75 lb. When the continuous pilot plant has been installed the flexibility and scale of operations in pulping will become even greater. Pulp refining can be studied from a 1½ lb. batch to a 25 ton per day scale. Bleaching studies may be carried out over the same wide range, using chlorine, hypochlorites, chlorine dioxide, or peroxides.

Chemical engineering approach stressed

One of the features most appreciated by industrial clients of the laboratory is the fact that the chemical engineering approach to research is employed rather than that of the theoretical chemist. Such methods are particularly valuable in the handling of development problems leading to industrial design and cost accounting.

Fundamental research is carried out principally through the organization of the laboratory as part of the Chemical Engineering Department of the College of Engineering. Master's and doctor's degrees in chemical engineering are conferred, in which the theses and several specialized courses are taken in the field of pulp and paper. Several students, on both the master's and doctor's level are now specializing in pulp and paper and it is expected that this group will increase. No specialized training is required on the undergraduate level as it is felt that the four undergraduate years should be devoted to the fundamentals of science and engineering, with specialization undertaken after the student has been thoroughly trained in fundamentals. Two graduate courses in pulp and paper are available to qualified seniors as electives.

Trainee program

Another form of personnel training has been in effect at the laboratory for several years. That is the Trainee Program in which promising young men of high school education are taken from the pulp and paper mills and given a year's intensive training in pulp and paper research methods. They are used full time in the laboratory as technicians although still in the employ of their respective companies, and are rotated on the various research problems under study in the laboratory. The men become acquainted with various pulping methods and gain an understanding of the various pulping variables. They are trained in physical and chemical testing methods, realizing the importance of such tests to the overall operation of the process. Each trainee is allowed to enroll in one three-hour course at the university for each semester of attendance. Courses in chemistry, mathematics and English, both written and oral, have been found to be particularly valuable to these men. Several companies are considering the use of this trainee program as a general "breaking-in" period for graduate engineers just entering the industry.

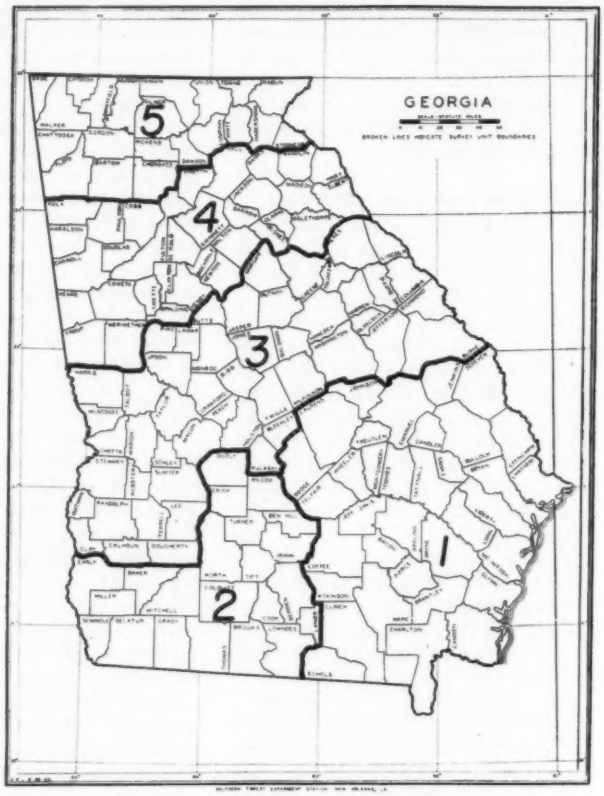
Such a program has been found to have a twofold advantage. First, the pulp mills gain by the fact that the training makes their men much more valuable, since these men are selected for their future possibilities as supervisory personnel. Second, the laboratory gains by the fact that additional technicians are available to assist the permanent staff in expediting the research problems under investigation. The sooner these problems are completed, the more rapidly the results are published and made available to the industry.

Industrial contract work

In the original chartering of the Engineering and Industrial Experiment Station by the state legislature, it was made possible for the Station to enter into contracts with private industry for the investigation of research problems. Contracts may be drawn up whereby the laboratory will investigate fundamentals or development problems for any of the pulp and paper companies. Such work is done at actual cost of the operation, with an additional overhead charge to cover depreciation of equipment, administration and utilities. The contract may specify at the request of the company sponsoring the project, that the investigation be considered confidential in nature so that no disclosures of data will be made by publication for limited periods of time. The contracting company may also exercise a patent option whereby any patentable information becomes the property of the company. Several such contracts are operating in the laboratory at present.

In summary, the research at the laboratory may be divided into three groups. The first group covers those projects sponsored by the Station itself and is made up of the personal investigations of the engineering staff members. The second group covers the research under investigation by graduate students, while the third group consists of those industrial problems being studied through contracts with commercial organizations. In all of this work the laboratory is carrying out the original intent of the founders of the Engineering and Industrial Experiment Station; that is, to apply all of our engineering facilities, both equipment and personnel, for the maximum service to the State of Florida and the South.

Georgia's forest survey units



Georgia's forest survey shows new trends*

E. L. DEMMON
Director, Southeastern Forest Experiment Station

RECENT GROWTH of the pulp and paper industry in the South has been phenomenal. Although pulp has been produced in the South for more than 40 years, this industry has had a tremendous expansion in the last two decades. In 1952 it produced over 80 per cent of all the kraft pulp made in this country and used more than 14 million cords of wood, or approximately 56 per cent of all the pulpwood cut in the nation. When new mills now under construction and planned additions to existing mills are completed, the industry's need for wood supplies will be substantially increased.

The South is such a huge region, with such a great diversity of forest types and conditions and such a multiplicity of forest users, that it is difficult to visualize the relation of the pulp and paper industry to the wood resource. It is simpler to take a section of the region and consider the trends that are taking place there in order to better understand the local problems. This discussion, therefore, will be limited to a consideration of the situation in Georgia. The state can serve as an example of what may be happening elsewhere in the South, since pulp and paper mills are distributed widely throughout the region and their impact on the forest is being felt increasingly in every part of the area.

Since 1921 the U. S. Forest Service has maintained two forest experiment stations in the South, with headquarters at New Orleans, La., and Asheville, N. C., respectively, working on regional forest research problems concerned with the management and best use of the forest land in this great region. Also, many of the forest utilization problems relating to the South have been studied at the Forest Products Laboratory, maintained by the U. S. Forest Service at Madison, Wis., since 1910.

A major Forest Service activity since 1930 has been the periodic survey of the forest resources of the region to give an accurate picture of what is happening currently to southern forests. The survey is carried on in cooperation with the states and local people, and the results are made available on a local, state and regional basis. Most industries and local groups are interested in obtaining information on forest acreages, timber and cordwood volumes, and current timber growth and drain by counties or groups of counties. Pulp and paper companies and wood-using concerns of all kinds have drawn upon the survey for basic information used in planning the location of plants, the procurement of raw materials, and acquisition of forest land.

Changing character of Georgia's forests

In Georgia the Southeastern Station is just finishing the field work on the second forest survey of the state, the first having been made in 1934-1936. By comparing information obtained from these two surveys, it is possible to visualize the changes that are taking place in our forest resources and to plan accordingly. Thus far, data have been summarized for the three forest survey units covering the lower piedmont and coastal plain portions of Georgia (see map). In these unit forests cover 65 per cent of the total land area.

Table I shows the cordwood volume of all sound trees over 5 in. in diameter. It also gives data for cull trees, which make up a considerable portion of the stand and represent a potential source of pulpwood, even though of little or no value for other purposes.

The variations in forest trends in these three adjacent units are indicative of the importance of obtaining forest information on a local basis. For example, during the last 18 years the volume of pines has increased in the two coastal plain units but has decreased in the lower piedmont. On the other hand, merchantable hardwood volume has decreased slightly in southeast Georgia and in the lower piedmont but has increased in southwest

*Address given before the Southeastern Section of Tappi at Savannah, Ga., May 8, 1953.

Table I—Trend in timber supply [1] (trees 5 inches d.b.h. and larger)

Unit 1—Southeast Georgia, 1934-1952

Species group	Growing stock			Cull trees (2)		
	1934	1952	Change	1934	1952	Change
	M cords	M cords	Percent	M cords	M cords	Percent
Pines	35,187	43,984	+25	267	2,123	+695
Soft hardwoods (3)	16,035	13,149	−18	4,422	6,835	+ 55
Hard hardwoods (4)	5,588	5,253	− 6	1,823	4,155	+128
Total	56,810	62,386	+10	6,512	13,113	+101

Unit 2—Southwest Georgia, 1934-1951

Pines	14,022	14,723	+ 5	150	472	+214
Soft hardwoods	2,879	4,693	+63	1,291	2,462	+ 91
Hard hardwoods	1,175	2,233	+90	869	2,140	+146
Total	18,076	21,649	+20	2,310	5,074	+120

Unit 3—Lower Piedmont of Georgia, 1935-1952

Pines	30,120	24,168	−20	534	4,064	+661
Soft hardwoods	15,326	13,180	−14	3,072	4,714	+ 53
Hard hardwoods	7,301	7,739	+ 6	2,447	4,883	+100
Total	52,747	45,087	−15	6,053	13,661	+126

(1) Cypress not included. (2) Trees of poor form, knotty, or too defective for sawtimber, but often suitable for pulpwood. (3) Black, tupelo, and red gums, yellow-poplar, soft maple, etc. (4) All oaks, hickory, ash, etc.

Table II—Proportion of pine drain that goes to pulpmills (trees 5 inches d.b.h. and over)

Item	Unit 1	Unit 2	Unit 3	Total
1937				
Total pine drain (M cords)	930	623	1,257	2,811
Pulpwood drain (M cords)	99	55	34	189
% pulpwood of total	10.7	8.8	2.7	6.7
951				
Total pine drain (M cords)	2,687	1,138	2,470	6,295
Pulpwood drain (M cords)	978	335	472	1,785
% pulpwood of total	36.4	29.5	19.1	28.4

Table III—Pulpwood production in Georgia and interstate shipments, 1948-1952

Year	Pine				Hardwoods			
	Total production	Shipped out	Shipped in	Net used in Ga.	Total production	Shipped out	Shipped in	Net used in Ga.
	M cords	M cords	M cords	M cords	M cords	M cords	M cords	M cords
1948	1,644	649	236	1,231	78	17	19	80
1949	1,669	465	192	1,396	103	25	9	87
1950	2,121	613	244	1,752	89	12	5	82
1951	2,279	674	330	1,935	83	13	7	77
1952	2,400	731	295	1,964	106	6	12	112
Total (5 yrs.)	10,113	3,132	1,297	8,278	459	73	52	438
Percent[1]	100	31			100	16		

Georgia. However, the volume in cull trees for both pine and hardwood has more than doubled during the period between surveys. This is understandable, as cull trees are usually left in logging operations and continue to grow.

Another interesting trend is the decrease in area occupied by the pine types. They have decreased in each unit, and for the three units the percentage in pine types dropped from about 80 per cent to 70 per cent of total forest area. The total area in forest remained practically the same in the coastal plain but increased by 20 per cent or over a million acres in the lower piedmont between surveys.

Increasing pulpwood demands

Georgia forests serve as a source of raw material for a great diversity of forest industries, ranging from large pulp and paper plants to small sawmills and wood-working factories. In recent years the pulp and paper industry in Georgia has continued to expand, most of the mills using primarily pine (95 per cent by volume) and operating by the sulfate process. In addition to the seven pulp mills now operating in Georgia, three new pulp mills are under construction, and some of the older mills are adding to their pulping capacity. This all adds up to more drain on the forests.

Table II shows the great increase that has taken place in the total cut of pine in Units 1, 2, and 3 between 1937 and 1951 and the proportion that goes to pulp mills. The combined drain on the forest was 2.2 times as much in 1951 as in 1937, but the pulpwood drain was 9.5 times as much. Pulpwood made up only 7 per cent of the total pine drain in 1937, whereas now it is approaching 30 per cent.

Of course, not all pulpwood produced in Georgia is used by Georgia mills. An appreciable portion (about 30 per cent) is shipped to mills in neighboring states. However, some pulpwood is also shipped into the state, but actually more than twice as much is exported as is imported. This information for the years from 1948 to 1952, inclusive, is shown in Table III.

Uses required for hardwood culls

Georgia is blessed with an abundance of both pine and hardwoods. For many years its pine trees have served as a major source for the naval stores industry (turpentine and rosin), as well as for lumber, boxes, and for many other purposes. Pine has been the principal source of pulpwood, and this use can be expected to increase; but, in terms of merchantable growing stock (trees 5 in. and over in diameter), hardwoods in the three Georgia units recently surveyed make up 36 per cent of the total volume. The hardwood volume in cull trees, however, comprises more than 80 per cent of the total cull volume. A summary of the amount of wood in cull trees in the three Georgia units, by principal species groups, is shown in Table IV.

Table IV—Volume of potentially pulpable wood in cull trees[1], Georgia Units 1, 2, and 3; 1952

	Thousand cords
Pine	6,659
Black and tupelo gum	6,760
Sweetgum	2,278
Yellow-poplar	527
Soft maple	2,660
Other soft hardwoods	1,786
Total soft hardwoods	14,011
White oaks	2,006
Red oaks	4,673
Scrub oaks	2,230
Hickory	654
Ash	575
Other hard hardwoods	1,040
Total hard hardwoods	11,178
Total all species	31,848

(1) Cypress and cedar omitted.

The proportion of cull trees among the pines increased from 1 per cent in 1934 to 7 per cent of the total pine volume in 1952; whereas in the hardwoods, cull volume increased from 22 to 35 per cent. Because cull in hardwoods is so large and continues to increase is all the more reason for finding uses for these trees which have no market at present, and which often interfere with the growth of the more valuable pines. It seems that if the pulp industry is to make the most of its opportunities it must necessarily become more and more interested in the utilization of hardwoods for pulp. Here is a great quantity of material not needed or wanted by other industries, the removal of which will

help to make forestry more profitable. Most of the present pulp mills have built up extensive forest holdings, some of them to the extent of meeting fully one-half of their wood needs. Although their main interest in the past has been in pine, these mills now find that in places they have nearly as much hardwood as pine. The presence of these hardwoods and the increasing demands for various kinds and grades of paper is stimulating research into methods of utilizing hardwoods for pulp. Although hardwoods accounted for only about 5 per cent of the total pulpwood used by Georgia pulp mills in 1952, new mills and the expansion of older mills are expected to substantially increase this proportion. Other uses for hardwoods may come from the installation of board mills and from expansions in the wood chemical industry; we can anticipate that a multitude of synthetic materials will be made from hardwoods in the future.

Improved forest practices needed

Our latest survey information indicates that Georgia forests are subject to intensive exploitation, with drain exceeding current growth for pines, although the opposite is the case with hardwoods. Fortunately, Georgia soils are among the best in the South for growing timber crops. However, current growth rates fall far below what can be obtained under good forest management. For example, the average acre of pine forest in Units 1, 2, and 3 has a stand averaging only 7.1 cords in volume, with an average growth rate of 0.55 of a cord per acre per year. From Station studies conducted at field centers in Georgia and in adjoining states, we have found that optimum pine growth requires a greater average volume of growing stock than 7 cords per acre—12-15 cords would be nearer the requirement. Also, with adequate fire protection, by planting bare and understocked areas, and by using other good forest management practices, pine forests should easily be capable of growing 0.75 to one cord of wood per acre per year.

To take advantage of their forestry opportunities, Georgia forest landowners should be made to recognize the value of good forest practices and put them into effect. Publicly owned forests, as well as those owned by the pulp industry, are generally well managed. It is the small, independent farmer who, by and large, is not doing a good job in forestry. Many public agencies and the pulp industry itself through its Southern Pulpwood Conservation Association and its individual mills are helping to educate the individual farmers who control the bulk of the land, but this has been a slow process. How to get better forestry practised is a real challenge to the pulp and paper industry.

Table V—Ownership of Commercial forest land in Georgia Units 1, 2, and 3, 1952

Ownership	Unit 1	Unit 2	Unit 3	Total	
	M acres	M acres	M acres	M acres	Percent
Public	594	72	354	1,021	6
Farm	3,216	2,535	5,054	10,805	62
Other private	3,817	450	1,279	5,546	32
Total	7,627	3,057	6,687	17,372	100

The current ownership of commercial forest land in Units 1, 2, and 3 is shown in Table V.

Importance of tree breeding

Another problem of vital interest to the pulp industry is the control of wood properties through tree breeding or genetics. How can we raise the yield of wood fiber per acre and improve its pulping qualities? Recently the Station and the Forest Products Laboratory initiated a study of slash pine in Florida to determine the relation of wood density, per cent of summerwood, and other properties to growth rate, to height in the tree, and to age of ring from the center of the tree. When we have a better understanding of these relationships it will be possible to select trees of really superior wood properties for breeding purposes. In such studies, we are working closely with the wood-using industries to determine the types of wood best suited to their various products. The pulp and paper industry must provide the specifications desired for pulpwood before we can aim at growing truly high-quality wood.

Past work on the sulfate pulping of southern pines and the development of multi-stage bleaching methods by the Forest Products Laboratory have led to a broader utilization of these species. The Laboratory also has shown that appreciable percentages of bark can be included in certain grades of paper or board without serious loss in strength of the product. In 1952 tests on southern gum and oaks showed that bleached semichemical pulp from these woods offers promise for use in paper milk bottles and other food containers. Southern gum cold-soda pulp was found to improve the quality of southern newsprint paper normally composed entirely of pine groundwood and sulfate pulps. Presently the Laboratory is pulping southern scrub oak for corrugating and liner boards, hardboard, and white papers.

Logging and sawmill wastes

The Laboratory has been gathering information on the performance of new types of bark peeling machines and wood chippers that will permit use of wood waste for pulp chips. Along this same line they plan during the coming year to assemble available cost data on dispersed as against centralizing barking and chipping.

A current Station project of interest to this group is an investigation of the feasibility of salvaging sawmill and logging waste for use in the production of pulp, hardboard, chip-core panels, or other products for which it is suited. With the value of stumpage at present levels, such salvage operations may prove economically feasible. This study is being conducted by the Station in the South Carolina piedmont in an area roughly 60 miles in diameter. Here there are 147 active sawmills, each producing between a few thousand and 3 million board feet per year. The amount of waste found was equivalent to 40 per cent of the present pulpwood production in the area. The study, which is still under way, aims to determine the minimum operable volumes of logging and mill waste and the most efficient methods of preparing, assembling, and transporting it to market.

In Units 1, 2, and 3 more than 1,300 operating sawmills have been cutting over a billion feet of lumber annually in recent years. In the most recent year for which data are available (1947) the pine lumber cut amounted to 978 million feet, and hardwoods 175 million feet. The annual waste approximated 780 thousand cords in the form of slabs and edgings and 580 thousand cords of logging material left in the woods. The only current use for most of this material is as low-grade firewood. Even if only part of it could be used economically for pulp, it would to that extent relieve some of the drain on the forest.

The Station's Forest Utilization Service, acting as a liaison activity between the Forest Products Laboratory and southeastern forest industries, is serving an important purpose in helping reduce wood waste, in finding uses for low-grade wood and little-used tree species, and in helping forest landowners and industries with their forest utilization problems.

The Forest Service, in all its studies, is aiming to improve the protection, management, and utilization of southern forests. No group has a greater stake in the future of these forests than the pulp and paper industry. Georgia's forests, as well as those of other southern states, are being called on increasingly to supply the raw materials needed for expanding industry. It is up to all of us to see that these forests contribute greater security and prosperity to all Georgians and to the nation. Future generations of Americans will need an abundance of wood.

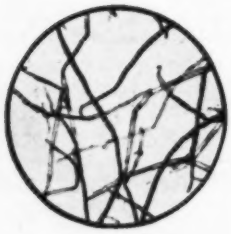
PAPER SKETCHES

AS EARLY as the 1710's American newspapers were sometimes printed on paper dyed BLUE..
THE common "CAT-TAIL" or swamp flag was being used quite extensively in New York state in the early 1860's for making paper hangings and cardboard.
GRADE A
PAPER containers were used for 35% of all the packaged milk sold last year.
LOUIS ROBERT, inventor of the fourdrinier type papermaking machine, designed his equipment, it seems, to make paper 24 inches wide... which was a popular width in France in those days.

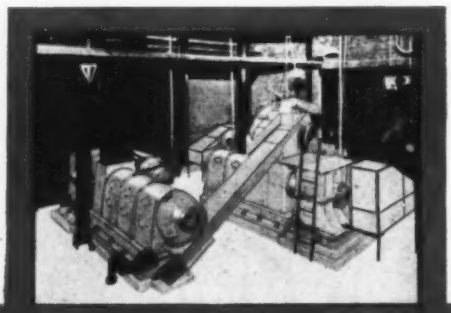
a LONG stride forward...

saves.....

Photomicrograph of diffuser washed kraft pulp.



Press units installed in leading southern kraft mill.



Photomicrograph of pressure washed kraft pulp. Note curling of fibers.

SUTHERLAND PRESSURE WASHING SYSTEM

...chemicals, heat, water, power, space...

increases operating efficiency

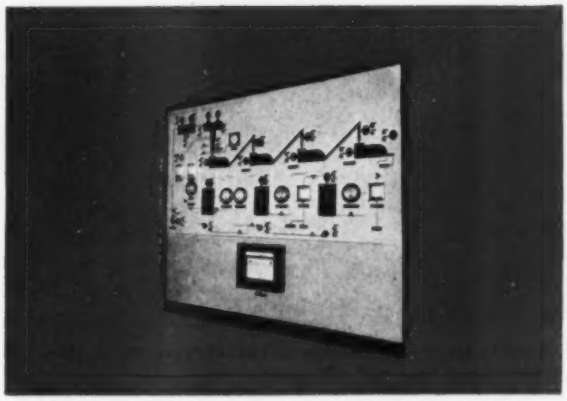
Based on a counter-current principle of washing in a series of specially designed presses, the *Sutherland Pressure Washing System* represents a real advance over other washing systems . . . real profit to the mill owner.

OPERATION

Pulp is pumped from a conventional blow tank at 3-5% moisture free consistency and thickened to twelve percent in an underpass thickener. Fed into the presses, it is alternately squeezed to about 36 to 38 percent dry and then diluted about 12 to 14 percent with liquor from the succeeding press. The strong liquor draining from the thickener is sent to the evaporators of the recovery system.

THE RESULTS:

1. *Water Consumption:* for a 300-ton system less than 200 g.p.m.
2. *Heat:* since pressure is used instead of vacuum, better blow-heat recovery results . . . evaporators get the black liquor at higher temperatures . . . no flashing of steam because of absence of vacuum.
3. *Power Requirements:* only 1.71 horsepower per air-dry ton for a four stage system.
4. *Chemical Recovery:* positive squeezing action insures uniform separation of liquor from pulp, higher yield. Even true knots lose much liquor in the operation.
5. *Pulp Quality:* intense rubbing action and pressure contribute to strength development of pulp. Positive curling of the fiber is a characteristic of pressure washed pulp.
6. *Space:* considerable space saving results from fact that presses are of compact design and may be arranged in a variety of ways to suit requirements of the individual mill. High consistencies and foam free operation obtained from system means that over-size transfer and settling tanks are not necessary.
7. *Control:* entire system is operated from a *single* panelboard, permitting easy adjustment of output to mill requirements.



Single Panel provides complete control of process for one operator. Audio and visual alarms signal operator instantly in the event of trouble.

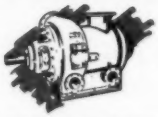
THE ADVANTAGES OF SUTHERLAND PRESSURE WASHING SYSTEMS ARE BEING DEMONSTRATED EVERY DAY IN ACTUAL MILL OPERATION.

SUTHERLAND PRESSURE WASHING SYSTEMS CAN BE FURNISHED IN FOUR AND FIVE STAGES TO FIT THE NEEDS OF THE INDIVIDUAL MILL . . . AT A CAPITAL INVESTMENT APPRECIABLY BELOW THAT OF CONVENTIONAL SYSTEMS.

For more information, write for a copy of "PRESSURE WASHING" which presents a case history of actual mill experience.

SUTHERLAND, INC.

TRENTON 6, NEW JERSEY



BREAKER TRAPS

HIGH YIELD SYSTEMS

Sold & Serviced by
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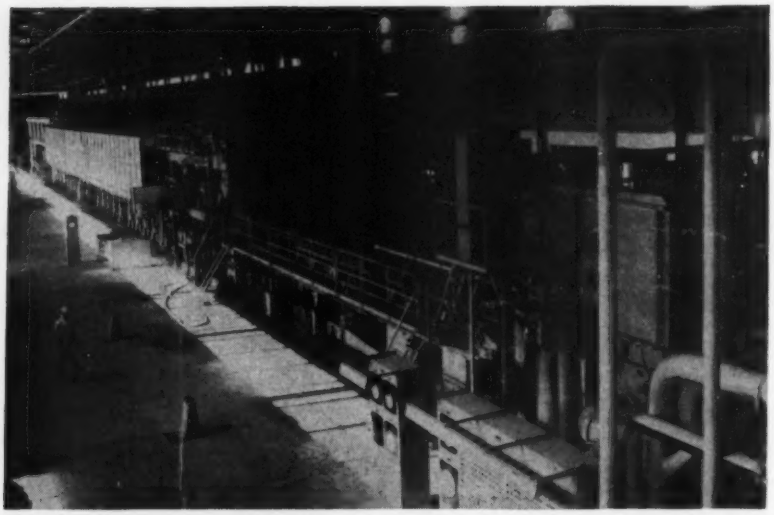
The Paper Industry News of the Industry



246-INCH Beloit paper machine at Halifax Paper; the machine is reported to be the widest in operation in the South

$5,800,000 Project Completed by Halifax at Roanoke Rapids

Expansion of the Halifax Paper Co.'s Roanoke Rapids, N.C., plant has been completed, according to an announcement made recently by the engineer-constructor, The Rust Engineering Co. of Pittsburgh, Pa., and Birmingham, Ala. Cost of the project was $5,800,000.

The expansion augments the firm's existing facilities for the production of unbleached kraft paper. The project included the construction of a two-story building to house a new Beloit Iron Works 246-inch paper machine together with the necessary stock preparation equipment, as well as additional finishing and shipping facilities, a high-density pulp storage tower, and a 6,000,000-gal. per day water treatment plant.

The new fourdrinier can operate at speeds up to 2,500 fpm. Its forming wire is 130 ft. in length. The machine comprises 33 paper driers, two felt driers (60 in. in diameter and able to withstand 125 psi pressure), latest type press section, pressure type headbox, a six-roll calender stack, breaker stack, Beloit mechanical sectional drive, mechanical reel puller, and a Jama Olmen ventilating system.

Necessary alterations were also made to the existing paper mill in order to integrate its production with the new addition. The new building was designed to permit installation of a second and larger paper machine without interrupting or slowing down mill operations.

D. M. Bare to Replace Burned-out Pulp Mill in $5,000,000 Project

Construction of a new pulp mill to replace the one destroyed by an explosion in May 1951 is currently in progress at the D. M. Bare Paper Co. plant in Roaring Spring, Pa. The mill and related improvements will cost approximately $5,000,000. Present production, amounting to 50 tons of book paper daily, will be increased.

According to J. B. Porter, general manager, the new unit will be one of the most modern in the United States.

The project will return the Bare mill to its former status as an integrated operation. At present, the plant is operating as a converting mill, buying its pulp on the open market.

Company officials have declined to estimate just when the new mill will be completed, but they report that the work is proceeding as rapidly as construction and operational conditions permit. Even as a converter mill, the plant is maintaining its productivity of 50 tons per day.

Alaska Gold Firm Considers Pulp Operation

Alaska Juneau Gold Mining Co., whose Alaskan operations have been shut down since 1944, may start manufacturing wood pulp. Directors have adopted a resolution that amounts to the granting of a short term conditional option on some of the firm's physical assets, including power plants, for establishing such an industry. If a satisfactory company were formed, Alaska Juneau would receive a minority but "substantial and equitable" stockholder interest.

C-Z Gives Final O. K. to St. Helens Merger

J. D. Zellerbach, president of Crown Zellerbach Corp., has announced that C-Z has definitely decided to proceed with its proposed offer of exchange to the stockholders of St. Helens Pulp & Paper Co. Crown Zellerbach has completed to its satisfaction an investigation of the affairs of St. Helens, and the offer of exchange was to be made about April 30, or as soon as all legal requirements have been fulfilled.

The proposed offer was announced February 19, when the board of directors of Crown Zellerbach approved an agreement in principle with the directors of St. Helens for this purpose. C-Z is in the course of effecting a two-for-one split-up of its common stock, which for convenience will take the form of a stock dividend. The offer of exchange to St. Helens stockholders was to be made on the basis of one share of C-Z common, after giving effect to the split-

NEWS HIGHLIGHTS

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up, for each 1-1/6 shares of St. Helens.

On February 19 the C-Z board also approved a similar agreement in principle covering a proposed offer of exchange to the stockholders of Canadian Western Lumber Co. Ltd. At the end of March C-Z had not yet completed its investigation of the business and affairs of Canadian Western because of their extent and relative complexity.

J. D. Zellerbach

J. C. Hendricks

Gair Merges American Coating Mills

George E. Dyke, chairman of the board and president of Robert Gair Inc., has announced that in order to operate all its folding carton and boxboard business directly, his firm has merged its wholly owned subsidiary, American Coating Mills Corp. On and after April 1 the subsidiary was to be known as the American Coating Mills Division, under the direct supervision of Norman F. Greenway, vice president of Gair. American Coating has plants at Elkhart, Ind., and Middletown, Ohio.

Richard L. Snideman, who has been associated with American Coating since 1928 and has been president since 1937, has officially retired as operating head. He continues with Gair as a consultant to management. J. C. Hendricks, heretofore vice president in charge of sales for American Coating, has been made general sales manager of the folding carton division of Gair. H. S. Rish, vice president of production for American Coating, has become manager of production for the American Coating Mills Division of Gair. He makes his headquarters in Elkhart.

Pulp and Paper Output in Northwest to Equal Lumber

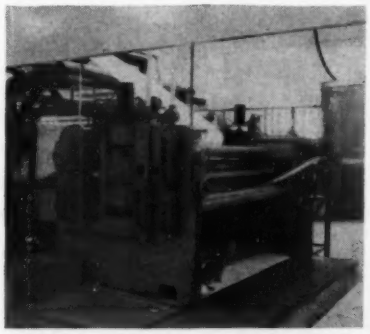
Dr. Albert J. Hall, director of the U. S. Forest Products Laboratory at Madison, Wis., recently made the prediction that in 40 years the Northwest will be producing pulp and wood fiber products "ton for ton" with the lumber output. He was addressing a meeting of the Eugene, Ore., Chamber of Commerce. The entire industry as it is known today, he said, will be radically changed, with products such as paper, insulating board, hardboard and fiberboard using much of the timber now used for lumber.

Sorg Paper Installs New Coating Equipment

A wider variety of coating materials can now be applied in the operations of Sorg Paper Co. at Middletown, Ohio, with the installation of an 80-in. four-roll reverse roll Contracoater. The Contracoater was developed through close cooperation between Sorg and the Dilts Machine Works Division of The Black-Clawson Co.

With the new type coater, principal unit in the 80-inch coating line, the Sorg system will apply a variety of coating materials including latices, resin emulsions, lacquers, organisols and plastisols to paper, fabric or film. Precision adjustment of the coating rolls makes possible the application of a wide range of uniform coating thicknesses and weights.

The complete installation comprises a Kohler constant-tension shaftless unwind, the 80-inch Contracoater reverse roll coater, an arch oven with radiant superheaters, an exhaust system, a cooling section, and a Kohler two-arm shaftless type winder, plus a sectional dc electric drive.



COATING MACHINE recently installed by Sorg Paper Co. at Middletown, Ohio

Gould Paper to Construct Hydroelectric Plant

Gould Paper Co. will construct a hydroelectric power plant on the site of its abandoned pulp mill at Gouldtown, N.Y. The operation is located on the Moose River. Company officials reported that an existing "head" of 45 ft., created by two dams at Gouldtown, will be utilized to develop 1,000 kw.

A 100-ft. penstock, which at one time carried water for the wheel of the older mill, is still usable, it was said. A second hand-generator has been purchased.

The old structure on the bank of the river—the pulp mill until a disastrous fire in 1928—will be altered and about half of it used as the power house. The electricity generated will be transmitted by wire to Gould's big mill at Lyons Falls about 2 miles away and will supplement power used there.

BEHIND THIS SCAFFOLDING is rising the structure that will house the pulp washers for the new semichemical mill at Union Bag & Paper Corp. in Savannah, Ga.; the plant is expected to go into operation either in late summer or early fall; a new paper machine —No. 6, which is part of the overall-expansion program—was to be in production by early May.

Kitimat Project Practical "In a Year or So"

The construction of a newsprint and pulp mill at Kitimat, B.C., is a "practical proposition," according to preliminary studies. However, any final decision to build is a year or so away.

According to Powell River Co. Ltd. in its annual report, an application has been made for a forest management license, and further study on the project awaits action on the application. President Harold Foley has stated that if the license is granted, a survey will be needed covering the engineering and economic aspects, as well as the timber supply. This phase may take a year or longer. The preliminary forest studies were carried out jointly by Powell River and Aluminum Co. of Canada.

Expansion Notes

Paper Mills (East Africa) Ltd., a British firm, is seeking to interest U. S. capital in investment in a new enterprise for the manufacture of paper from wattle trees and sisal poles. An option has been obtained on a factory at Thika, Kenya. It is claimed that the type of paper that can be made from wattle and sisal is particularly suitable for the manufacture of cardboard and paper bags for cement.

International Paper Co.'s Northern Division at Tonawanda, N.Y., has been granted a rapid tax write-off certificate by the Office of Defense Mobilization for 50 per cent of a $310,000 expansion to produce bleached soda pulp.

Gibraltar Corrugated Paper Co. of North Bergen, N. J., has purchased the display division of River Raisin Paper Co., Monroe, Mich.

Announcing

TWO OUTSTANDING NEW STOCK PREPARATION MACHINES

E. D. JONES & SONS COMPANY

has taken over the manufacture and sales in North America of the Lamort High Frequency Screen and Lamort Cellular Filter, adapted from designs of E. & M. Lamort Sons, Vitry-Le-Francois, France.

E.D. Jones Lamort

CELLULAR FILTER

Equally adaptable for white water, raw water or as a pulp thickener, the Lamort Filter is notable for its excellent performance under all conditions, delivering peak efficiency under normal load or surges. Completely automatic. Uses no chemicals and rarely any make-up fibre. Requires only a small space. Recovered stock of high consistency — 8% to 10%.

E.D. Jones Lamort

VIBRANT SCREEN

Simple and sturdy in design. The Lamort Screen has unique advantages — featuring high capacity, a new method of shock absorption, simple efficient adjustment of stroke intensity, unusual ease of cleaning and servicing.

Jones versions of the two machines will be designed for American Mill conditions. First Jones units will be completed within a few months. Photographs, specification data and other information now available.

E.D. Jones

For full details write

E. D. JONES & SONS COMPANY, PITTSFIELD, MASS.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

Brunswick Pulp & Paper Celebrates 15th Anniversary at . . .

Modern 460-ton per day bleached sulfate pulp mill in Georgia

IN FEBRUARY OF 1938 the first production got underway at Brunswick Pulp & Paper Co. in Brunswick, Ga. The company had been organized in 1936 by Scott Paper Co. and the Mead Corp. Construction was started in 1937.

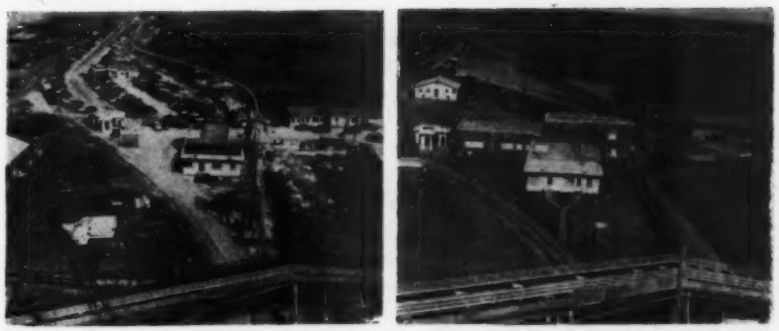
Designed originally to turn out a daily 150 tons of bleached sulfate pulp, the capacity of the mill was enlarged in 1940 to 200 tons. This was later stretched to 245 tons, with a 1948 expansion program bringing this total to 290. In June of 1950 the operating management presented to the firm's principals a plan for increasing the daily tonnage to 400. This expansion program was completed in 1951.

However, increased efficiency and the latest in equipment has brought the capacity to 462 daily tons—as of February 1953. And for the first six weeks' cost period of the year the plant recorded the most successful production period in its history.

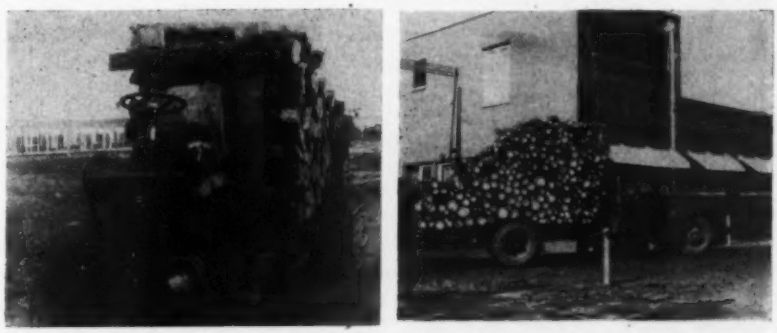
Among the recent improvements undertaken as part of expansion programs were a new steel shed and maintenance shops, new machine room, administration building, buses used in the firm's transportation facilities for employees; new first-aid room with the most up-to-date equipment obtainable, not to mention new production equipment installed throughout the mill and the latest in wood handling methods in use on the timber holdings.

Other factors in the 15-year growth of Brunswick Pulp & Paper are as follows: the number of employees has increased 116 per cent; the payroll has increased 551 per cent; the production tonnage has increased 331 per cent; the pulpwood consumption has increased 270 per cent; and timber acreage has increased 938 per cent.

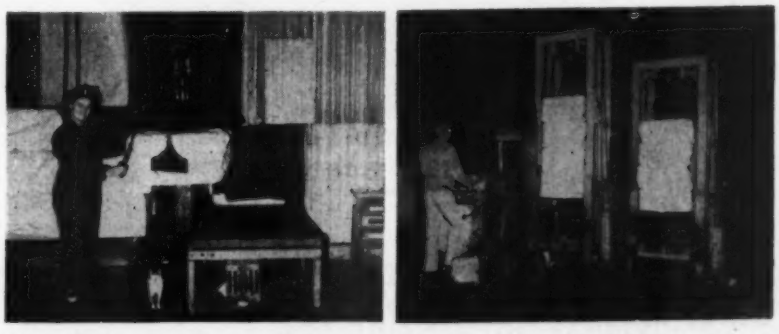
E. J. Gayner III is president and general manager; W. R. Scott III, secretary-



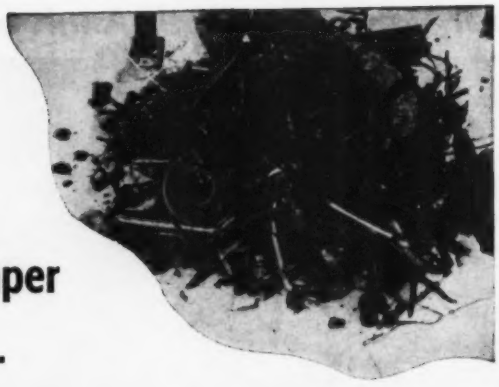
ADMINISTRATION building 15 years ago and today; extensive landscaping is big change



LATEST in pulpwood trucks have replaced outdated and less efficient equipment

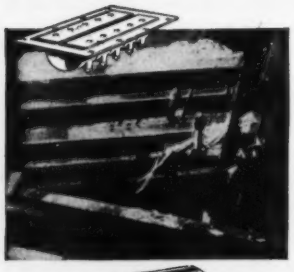


BALEHOIST operation shows contrast between old and new at Brunswick Pulp & Paper



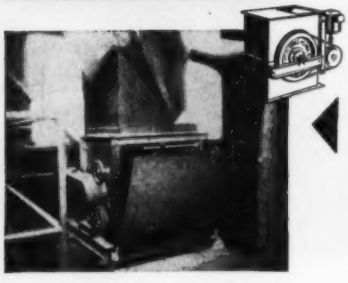
Here's why Pulp and Paper Mills Need—

DINGS MAGNETIC PROTECTION . . .



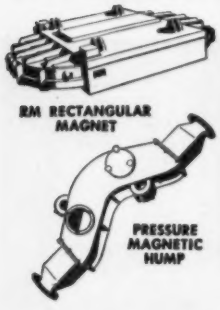
THE junk above is an actual tramp iron accumulation removed by a Dings Magnet installed in a Wisconsin paper mill . . . a rough diet for pumps, screens, defibrators and other equipment.

Look at the iron on this Dings Perma-Plate—a powerful non-electric magnet that can be installed in chutes, ducts, or above belts to remove iron from wood chips. Magnetic Permanence guaranteed forever. Engineering data in Catalog C-1205-A, write for it.



Fully automatic iron removal with a Dings Magnetic Pulley — used here as the head pulley on a chip belt. Iron is discharged separately from chips. Dings Pulleys are unbeatable for power, economy. Write for construction details, capacities.

Dings Non-electric Drum-type Separator installed in ductwork carrying chips separates iron automatically. Perma-Drums can be installed almost anywhere in chutes or ducts. Magnetic permanence guaranteed. Details in Catalog C-1100-A.



For removing iron from liquid lines, or chutes either the most powerful rectangular magnet made, Dings RM, or a Magnetic Hump equipped with two Dings Perma-Plates. Write for Bulletin 653, and see your Dings representative whatever your tramp iron problem may be.

DINGS MAGNETS

DINGS MAGNETIC SEPARATOR CO.

4762 W. Electric Ave., Milwaukee 46, Wis.

treasurer; G. K. Singletary, plant manager; Malcolm Pineo, technical director; W. J. Brown, operating and mechanical superintendent, and W. W. Kraus, plant engineer.

Knowlton Bros. Production Affected by Atom Tests

Knowlton Bros., Watertown, N.Y., manufacturers of specialty papers, have arranged their production schedules of x-ray film wrapping paper so that radioactivity drifting eastward from atomic tests in Nevada will not spoil the product.

The firm operated its plant Sunday, March 15, and worked overtime on the following day in anticipation of the first of the current series of blasts at Yucca Flats, Nev., March 17. Since then the plant has been avoiding work with the paper until such time as it appears that the radioactive particles are no longer present in the air or water.

Robert W. McCormick, Knowlton vice president, explained that radioactive materials are carried eastward by prevailing winds in amounts insignificant to human life or safety, but which are "hot" enough to have a potential bad effect on highly sensitized x-ray film.

Hoberg Sues Government for Tax Refund

Hoberg Paper Mills of Green Bay, Wis., recently sued the Bureau of Internal Revenue for a refund of $45,750.06 in interest on income and excess profits taxes. The firm claimed that the interest was "erroneously assessed and collected."

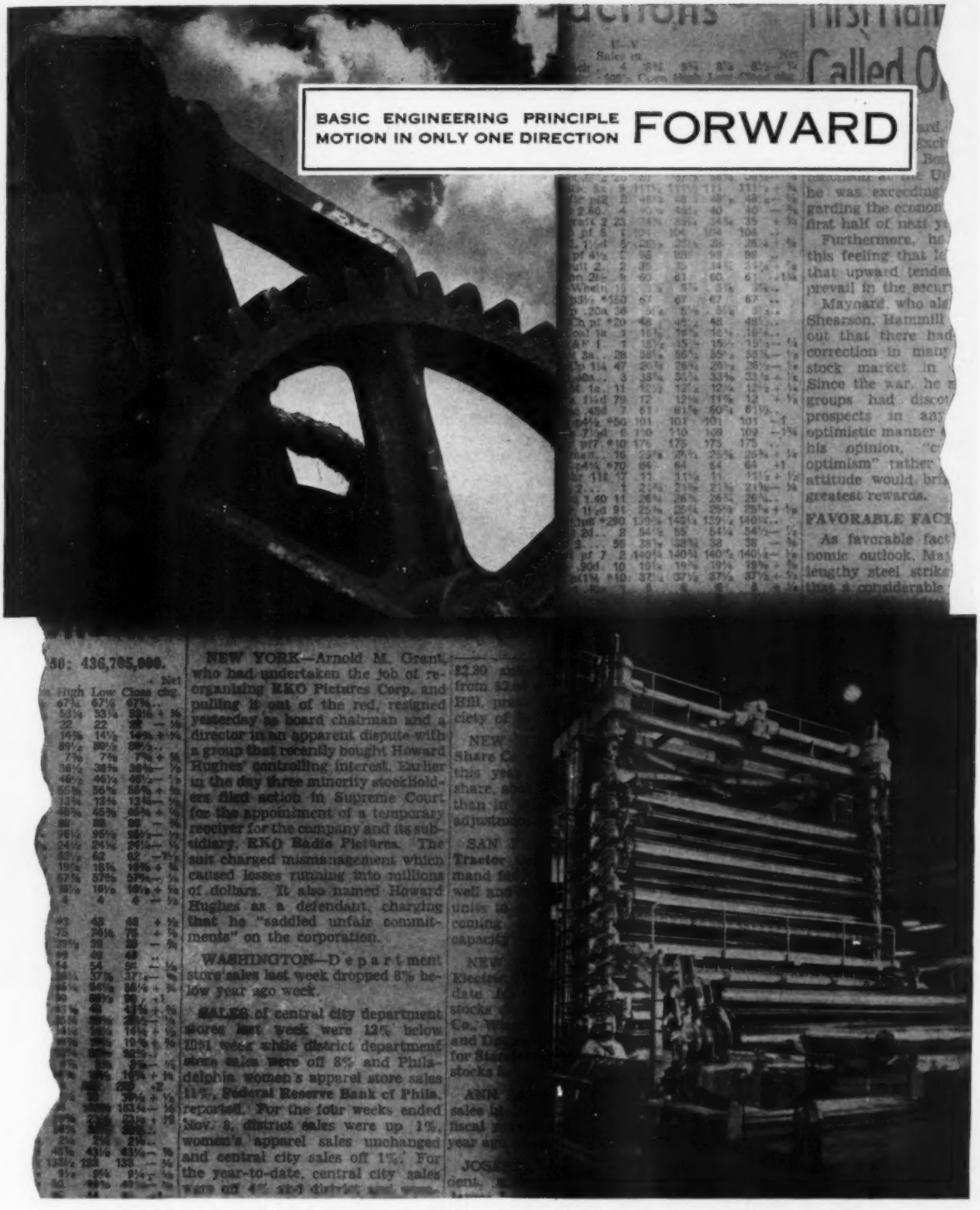
The firm charged that the interest was on tax payments that it had deferred paying under the law pending decisions on tax disputes. It claimed that the deferred payments should not have collected interest until the disputes were settled.

Hoberg filed two complaints in federal court. According to one, the Bureau of Internal Revenue erroneously collected $10,557.20 in interest on 1942 income taxes and $13,072.89 on 1942 excess profit taxes. The second complaint charged that the Bureau mistakenly collected $8,756.30 in interest on 1943 income taxes and $13,363.89 on 1943 excess profits taxes.

Ultra-Violet Absorption Used in Organic Determinations

The use of an ultra-violet absorption method for precise determination of complex organic compounds in lignin preparations has been disclosed by Dr. Otto Goldschmid of the research division of Rayonier Inc., Shelton, Wash.

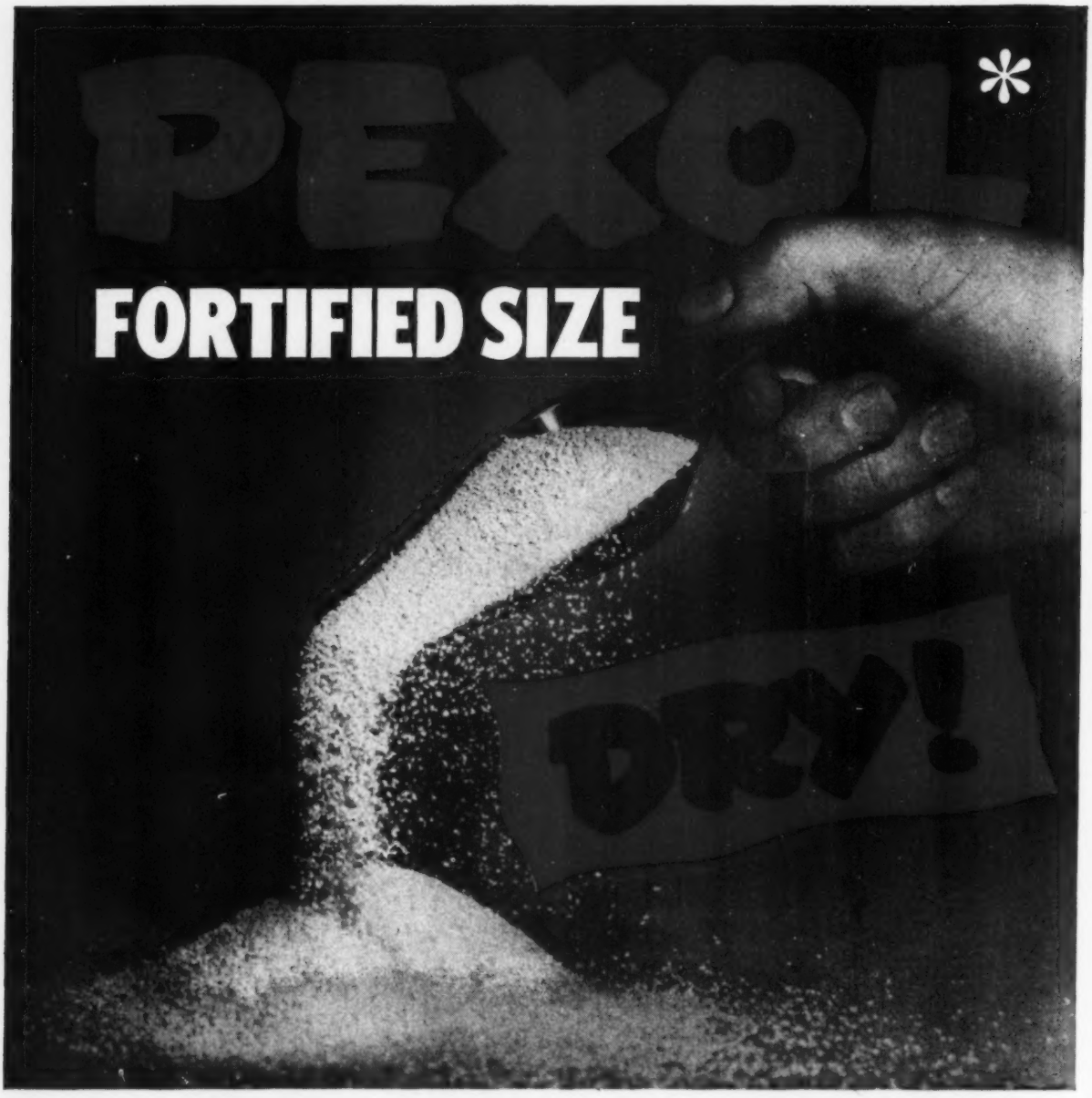
Dr. Goldschmid described a method in which the spectra of lignin mixtures are determined and then compared with



Engineers for 51 Years... **J. E. SIRRINE COMPANY**

GREENVILLE • SOUTH CAROLINA

A DEPARTMENTALIZED ENGINEERING ORGANIZATION SERVING BUSINESS, COMMERCE AND INDUSTRY



If you're set up to use dry size, and you'd like to get the many advantages of a *fortified* size, you can do so—with dry Pexol. Mills report substantially lower size cost per ton of paper and paperboard when using Pexol dry size. Similar savings are effected through use of paste Pexol.

Let us send you detailed information that will show you how dry Pexol can save you money.

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Paper Makers Chemical Dept., ***HERCULES POWDER COMPANY*** *961 King St., Wilmington 99, Del.*

SIZING MATERIALS AND CHEMICALS FOR PAPER

PPS3-1

the absorption bands of known compounds. He declared that the method provides a relatively quick and accurate tool for difficult determinations in laboratory research on wood derivatives.

Customs Court Cases

United States financial assistance to European governments is reacting to the detriment of the domestic paper industry in a flood of low-priced paper importations from nations so benefiting. This view was expressed recently in a report issued by Warren B. Bullock, manager of the Import Committee of the American Paper Industry.

Finland, whose paper and pulp industry was provided with some $40,000,000 for the refurbishing of its mills, has begun large scale shipments of kraft test liner at prices that are attractive to U. S. consumers as against the cost of similar paper produced under American wage standards. Austria has received $36,000,000 in cash, in addition to technical assistance and know-how, resulting in the addition of new machines or the modernizing of old equipment to such an extent that greaseproof and glassine papers are being received in the U. S. at prices that domestic producers cannot meet profitably.

The total value of paper imported during December was larger than the total of any month since July 1951 despite the fact that there has been a 30 per cent reduction in the dutiable value of Scandinavian coarse papers since the middle of 1952. The sharpest increases in tonnage have been in M.G. kraft wrapping and test liner, both from Finland, though considerable kraft has also been received from Sweden.

Recent court decisions

Paper entered at a southern port as paper stock, duty free, actually used for printing purposes, has been held dutiable as printing paper because it was not sufficiently mutilated to prevent its use, according to Mr. Bullock's monthly report on customs court cases.

Importers have lost their protests against the classification of 16 shipments of paper napkins from England and Denmark. The napkins were claimed to be dutiable as paper cut into shapes at 15 per cent but were held by the court to be dutiable as manufactures of cellulose wadding at 6 cents per pound plus 7½ per cent, being produced in two or three plies.

The United States Court of Customs and Patent Appeals has decided that tall oil, a by-product of the sulfate pulp process, is dutiable as a non-enumerated manufactured article at 20 per cent, and not as waste at 7½ per cent as claimed by the importer. Since this case was initiated, a reciprocal trade agreement has reduced the duty rate to 10 per cent.

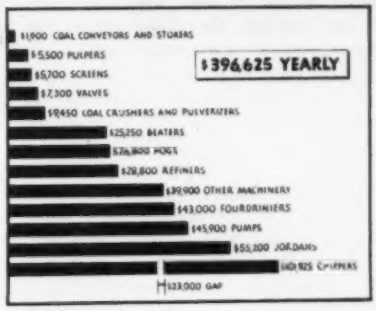
Customs officials have been advised by the Import Committee that highly bleached bagasse pulp, which a West Coast merchant plans to import from South or Central America, is properly duty free as paper stock. The Tariff Act provision for duty free pulp applies only to wood pulp, though the materials are for identical ultimate use in papermaking.

Tramp Iron Damage in Paper Industry: $2,400,000 a Year

Nearly $2,400,000 in machinery damage was suffered last year in paper mills because of nails, spikes and other insignificant bits of metal. One out of every two mills was shut down.

Damage to processing equipment reached almost $400,000 in only 178 paper mills—the number answering a recently conducted survey directed to 918 mills. An average of $2,227 was lost in machinery breakdown and downtime in each mill, of which there are 1,071 in the country. The survey was undertaken by the Superintendents Association and Eriez Mfg. Co. of Erie, Pa., to determine the tramp iron problems existing in paper mills. Among others, 72 pulp mills, 31 converters, six straw mills and 23 boxboard plants responded.

Damage to equipment totaled $396,625 annually: $26,800 to hogs; $55,200 to jordans; $101,925 to chippers; $28,800 to refiners; $7,300 to valves; $43,000 to fourdriniers; $45,900 to pumps; $9,450 to coal crushers and pulverizers; $5,700 to screens; $1,900 to coal conveyors and stokers; $25,250 to beaters; $5,500 to pulpers, and $39,900 to other machinery. Replacement of valves and pumps accounted for 14.4 per cent of the paper industry's annual tramp iron bill.



GRAPH showing how ferrous contamination affects specific types of paper processing machinery

The questionnaire showed that 25.4 per cent of the industry's yearly tramp iron damage bill is the result of ferrous contamination injury to chippers ($101,925).

Approximately 29 per cent of all tramp iron damage is a result of repairs and replacement of parts in beaters, pulpers, and refiners. Even the fourdrinier is a victim of stray iron particles, as mill operators and engineers report that 12.3 per cent of the damage done by tramp iron occurs to the screens and rolls of this machine.

Newsprint from Sawgrass Planned in $500,000 Everglades Project

FLORIDA newspaper editors and publishers meeting in Tallahassee have witnessed a test run of newsprint made from Everglades sawgrass. It is thought that the project may lead to the establishment of a new south Florida industry.

If present plans materialze, a $500,000 pulp mill will be built in the heart of the Everglades near Belle Glade. The plant will turn out a daily 40 to 50 tons.

Test runs of the new paper were run through the high-speed Goss press of the *Tallahassee Democrat*. Present for the demonstration were state officials, the promoters of the project, members of the Florida Daily Newspaper Association, and members of the Associated Press Association of Florida.

The process is admittedly in the laboratory stage. Research has been conducted at the Herty Foundation in Savannah, Ga., where the rolls used in the Tallahassee test were produced. Whether the paper can be produced profitably on a commercial scale and sell for less than the conventional wood pulp product remains to be demonstrated.

Idea not new

The idea of producing paper from Everglades sawgrass is not new. A plant for that purpose was set up at Leesburg, Fla., about 30 years ago. The project was a stock promotion and admittedly too much of the invested capital went into the pockets of the promoters. After the mill went into operation it was found that freight rates made the product too costly when compared to competing pulp.

The sponsors of the Belle Glade project have declared that they can produce newsprint of a quality comparable to that used by the *Miami Daily News* at about $80 per ton. They stress that this is an estimate, with many factors as yet undetermined.

The new paper is called celsedge and

is made 100 per cent from sawgrass. Rolls run through the Tallahassee presses were of the same weight and general appearance as conventional newsprint. Some of the paper was dark, while some was bleached to a clear white.

Amphibious harvesting

The sawgrass project is being pushed by ex-Marine Maj. Carl L. Sackett of Madison, Fla., who is familiar with the earlier operation, and Joseph G. Weimer of Montevideo, Uruguay. Mr. Weimer is an expert in the utilization of waste fibers. He is known as an authority on the development of paper from bagasse.

In August 1950 the two men obtained from the trustees of the State Internal Improvement Fund a lease entitling them to harvest the sawgrass from thousands of state-owned acres in the Everglades. Amphibious harvesting machinery has been designed, and the sponsors say that nothing now stands in the way of commercial exploitation. The grass, according to Mr. Weimer and Maj. Sackett, replaces itself at such a fast rate that a comparatively small area would supply the proposed mill "for all time." During the long Florida growing season, according to quoted studies, the sawgrass grows at a rate of an inch per day. Roughly, five tons of sawgrass are required to produce one ton of pulp.

March Newsprint Statistics

Production of newsprint in Canada (including Newfoundland) during March amounted to 484,276 tons, while shipments were 441,512 tons. Output in the United States was 91,911 tons, and shipments were 94,505 tons, making a total North American production of 576,187 tons and shipments of 536,017 tons. This compares with production of 576,125 tons and shipments of 551,858 tons in March of 1952. North American production in March 1953 was greater than in any March on record. The figures were released by the Newsprint Service Bureau, New York, N.Y.

The Canadian mills produced 7,700 tons less in the first three months of 1953 than in the corresponding period last year, which is a decrease of 0.5 per cent. The output in the United States was 23,016 tons, or 7.9 per cent, below that of the first three months of 1952. Thus, the total continental decrease amounted to 30,716 tons, or 1.8 per cent.

Stocks of newsprint paper at the end of March at the Canadian mills were 201,846 tons, at U.S. mills 8,697 tons, making a combined total of 210,543 tons. This compares with 170,373 tons on February 28, 1953, and 175,422 tons at the end of March 1952.

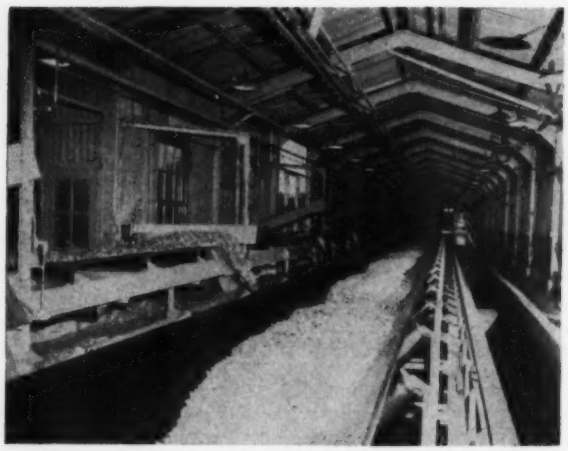
Newsprint Notes

No Major Obstacles

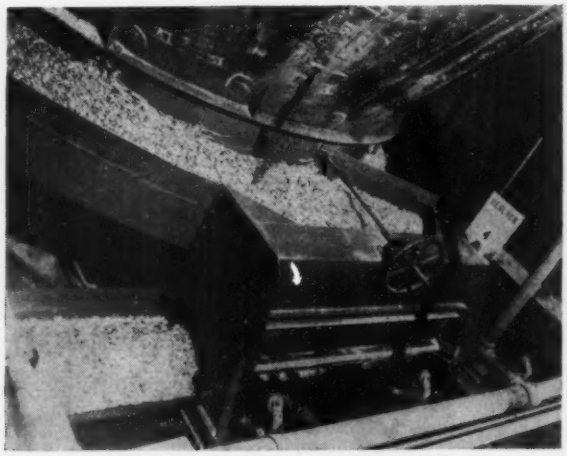
now stand in the way of the creation of a newsprint industry in Alaska, according to Ira T. Wilson, chief of the U. S. F. S. timber management division. He told the House Interstate Commerce Committee that the Tongass National Forest contains 78 billion board feet of timber.

St. Croix Paper Co.

was to boost the price of its newsprint $2 per ton effective May 1. This will bring the New York, N.Y., delivered price to $123.



UPPER HORIZONTAL RUN (above silos) of 72-in. roller bearing belt conveyor at Camas; at rear is traveling tripper for discharge into desired silo



LOOKING DOWN on rotary 17-ft. diameter circular table feeder for discharging chips from No. 4 silo; volume is regulated by hand-wheel plow

6-foot Conveyor Speeds Chip Handling at Crown Zellerbach Mill

AN INTEGRATED conveyor system from chipper to storage silos and succeeding operations is notable among recent improvements and additions at the Camas, Wash., mill of Crown Zellerbach Corp.

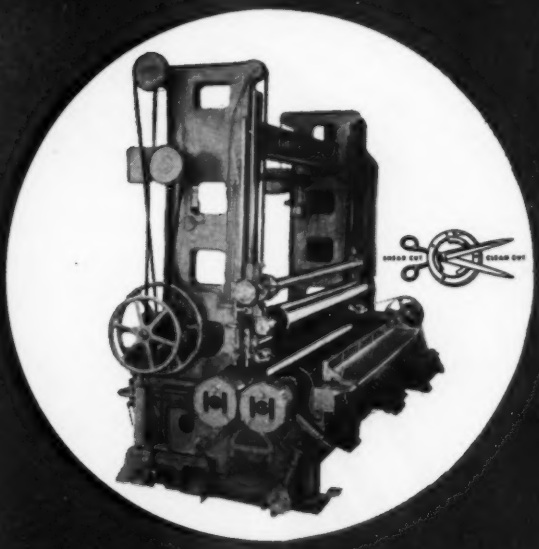
The Camas operation is a specialty mill using eight different woods in the production of 14 types of pulp. The daily paper output totals 700 tons. Pulpwood arrives by water, truck and specially converted open-top box cars. The latter brings chips to the Camas mill from sawmills in Oregon and Washington, where refuse wood that would formerly have been burned or wasted is now utilized for the production of pulp and paper.

The conveyor system is part of an improvement project at the mill. Included in the overall program were the installation of a modified Bellingham-type hydraulic barker, a log washer, and a six-knife 153-in. diameter Sumner whole-log chipper.

A particularly outstanding feature of the conveyor system is a 72-in. wide roller-bearing rubber belt conveyor from the feeder-conveyor under the chipper to the tops of six 75-ft. high 44-ft. diameter concrete silo storage bins. The belt rides on Link-Belt Series 400 roller-bearing troughing idlers equipped with 6-in. diam. equal-length interchangeable steel rolls, with end rolls set on a 45° slope.

It has been estimated that using the 45° end rolls has—in the 72-in. width—increased the handling capacity as much as 60 per cent.

The belt, built by Pioneer Rubber Mills, operates at a speed of 330 fpm and has been in service a little more than three years. The foot end of the con-



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veyor has a horizontal run of 50 ft., followed by a 250-ft. incline of 19 degrees up to the horizontal run over the storage silos. The feeder-conveyor from the whole-log chipper delivers to the horizontal run of the belt at a point close to the start of incline. Chips from the rail cars can be delivered to the horizontal run of the 72-in. belt at a point closer to the foot end. This permits the conveyor to carry chips from both sources simultaneously.

A 36-in. wide flat belt conveyor, handling chips received by rail, parallels the 72-in. troughed belt above the storage silos. Discharge of chips to any desired silo is effected by plows hand-set across the belt.

The bottom of each silo is fitted with a structural steel conical unit to permit proper discharge through the medium of a Link-Belt rotary 17-ft. diameter circular table feeder operated by a 20 hp electric motor through suitable enclosed gear reduction. Each rotary feeder has a hand-wheel-operated adjustable plow that can be placed in any desired position to regulate the volume of chips plowed off to the reclaim conveyor.

New Maine Foundation Subscribers

John B. Calkin, secretary of the University of Maine Pulp and Paper Foundation at Orono, has announced the names of 10 new subscribers to the Foundation.

New company members named by Professor Calkins were Hollingsworth & Whitney of Waterville, Maine, and Mobile, Ala.; Balck-Clawson Co. of Hamilton, Ohio; Rice-Barton Corp. of Worcester, Mass.; Sandy Hill Iron & Brass Works of Hudson Falls, N.Y.; Fraser Paper Ltd. of Madawaska, Maine; Oxford Paper Co. of Rumford, Maine, and Asten-Hill Mfg. Co. of Philadelphia.

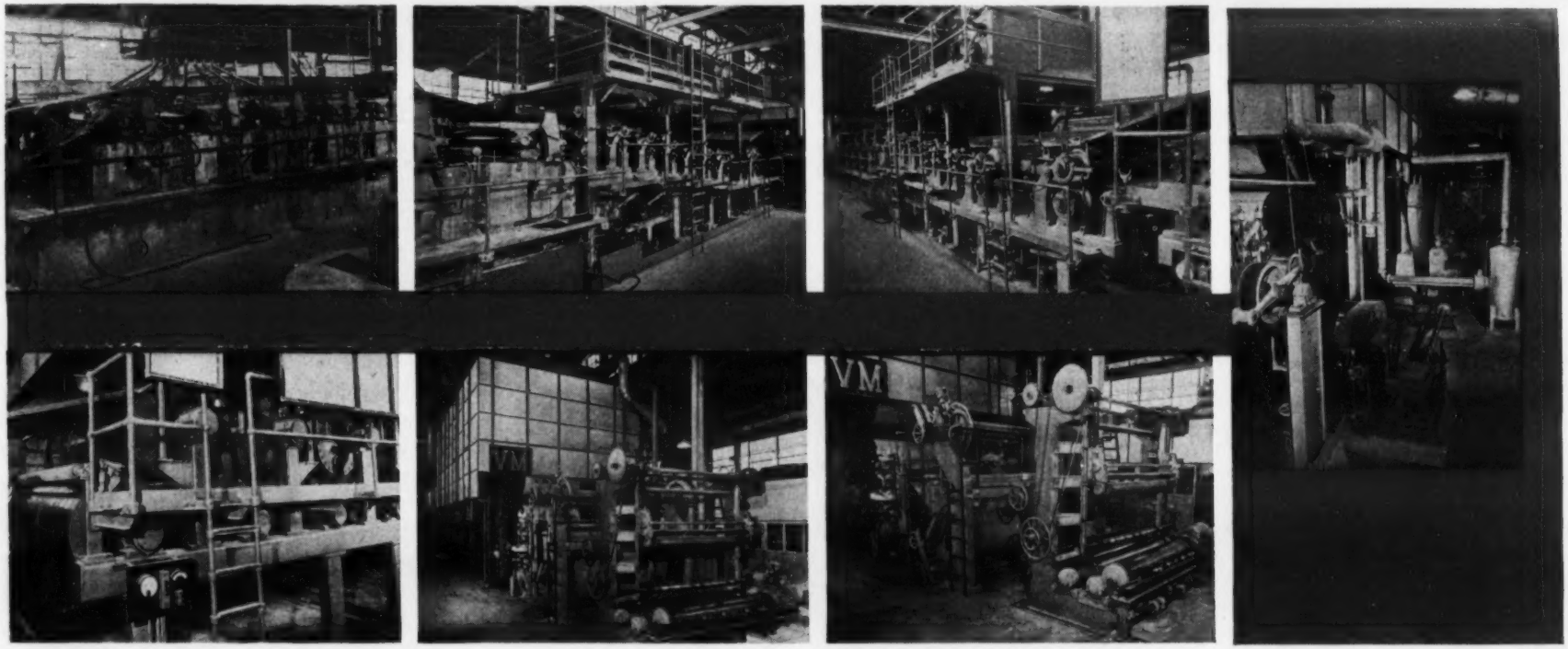
Special gifts have been received from Draper Bros. Co. of Canton, Mass.; A. Hartung & Co. of Philadelphia, and The Mead Corp. of Dayton, Ohio.

Nat. Gypsum Transfers Export Sales to N. Y. C.

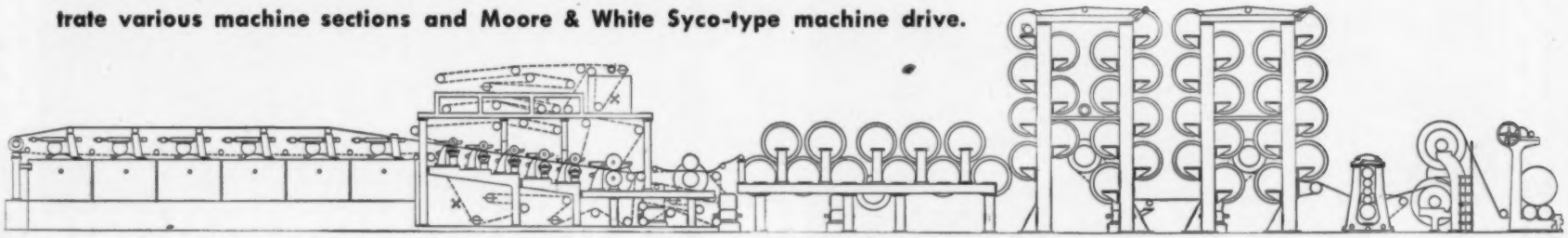
National Gypsum Co. of Buffalo, N.Y., has announced the transfer of its export sales department to New York City. To be located in the Graybar Building on Lexington Ave. where the firm's district sales office is already established, the department was expected to be in full operation by April 1.

William Crosscup has been named manager of export sales. He will direct all export activities except the Canadian contractural sales, which will still be transacted in Buffalo.

Commenting on the move, Dean D. Crandell, vice president in charge of in-



New Moore & White cylinder machine installed at the plant of The Norristown Magnesia & Asbestos Company, Norristown, Pa. The photographs shown illustrate various machine sections and Moore & White Syco-type machine drive.



The MOORE & WHITE Company 15TH STREET AND LEHIGH AVENUE, PHILADELPHIA 32, PA. • CUSTOM-BUILT MACHINES FOR PAPER MAKERS

dustrial and export sales, declared, "In order to build an increasing export business, it is essential to be located where visiting contractors and building supply dealers can have access to sales personnel. New York City is the commercial center for all such customers. Some 80 per cent of all architects handling South American construction are located in New York City, as well as 25 of the 30 companies exporting our paint products. Therefore, this new location will enable more efficient coordination of National Gypsum's export business."

TWO SHORE-BASED cranes with elevated cabs unloading jackstrawed pulpwood from LST with grapples at Anglo-Canadian mill in Quebec, P. Q.

Anglo-Canadian Shore and Sea Cranes Increase Efficiency in Wood Handling

DELIVERING PULPWOOD to its mills at minimum cost is a problem that has been solved by Anglo-Canadian Pulp & Paper Co. Ltd. by what is probably a unique way of using cranes.

Headquarters of Anglo-Canadian's principal woods operation is about 170 miles down the St. Lawrence River from Quebec City. Here the firm has built a town (the shipping point) on the north shore, although actual operations are carried on some 50 miles back in the bush. Cutting proceeds winter and summer, the pulpwood being hauled to waterways and floated to dockside at the town. The project supplies about ⅓ of Anglo-Canadian's pulpwood needs, the balance being purchased from other sources, usually being shipped on river boats to Quebec and unloaded into booms or picked up by the firm's ships at way points.

Rebuilt LST's

Anglo-Canadian owns four LST's that have been rebuilt for carrying pulpwood, as well as a large "river boat." Three of the LST's are customarily loaded at the shipping point, where the blocks are floated down a flume and through a chute directly into the vessels' holds. When the holds are full (about 900 cords) the hatches are battened down, and a jackstrawed deck load of about the same size is taken on. Maximum load is about 2,000 cords.

Seven-hour loading

Loading requires about seven hours and the trip to Quebec City about 14. At dockside in Quebec, two K-360 Link-Belt Speeder cranes with elevated cabs (operator's eye level approximately 18 ft. above the ground), a Canadian-made crawler crane, and a bridge crane go to work with grapples. The pulpwood is unloaded in 5½ hours. The newer K-360 has a 70-ft. boom.

The firm uses its fourth LST to collect wood from docks up and down the St. Lawrence. It is equipped with special platforms on which two older K-2 cranes are installed.

Although the same size as the other LST's, the crane-equipped vessel returns to the Quebec mill with 3,500 cords instead of 2,000. The greater carrying capacity is possible because the pulpwood is stored in bundles in the holds and on the deck, instead of being jackstrawed as in the holds and on the decks of the other LST's.

The four LST's and the river boat bring about 400,000 cords of pulpwood per year to Anglo-Canadian mills—300,000 cords to Quebec and 100,000 cords to Chandler on the Gaspé Peninsula.

During the winter the two K-360's supply the mill from the backlog stockpile and also unload and stockpile pulpwood arriving by rail and truck. In the spring the cranes are put to "odd jobs," such as dredging up water-logged pulpwood and bark that has fallen overboard and sunk beside the dock.

British Columbia Logging Suffers

Spring logging in British Columbia is getting a slow start this year, due mainly to the fact that log stocks are high and prices low. There was a 10 per cent drop for January and February compared to the same months of 1952. Log stocks are one-third larger than they were in 1951. The price of fir is $20 a thousand under the 1951 peak, while cedar prices are down $30.

Ambridge Foresees Pulp Capacity Exceeding Demand

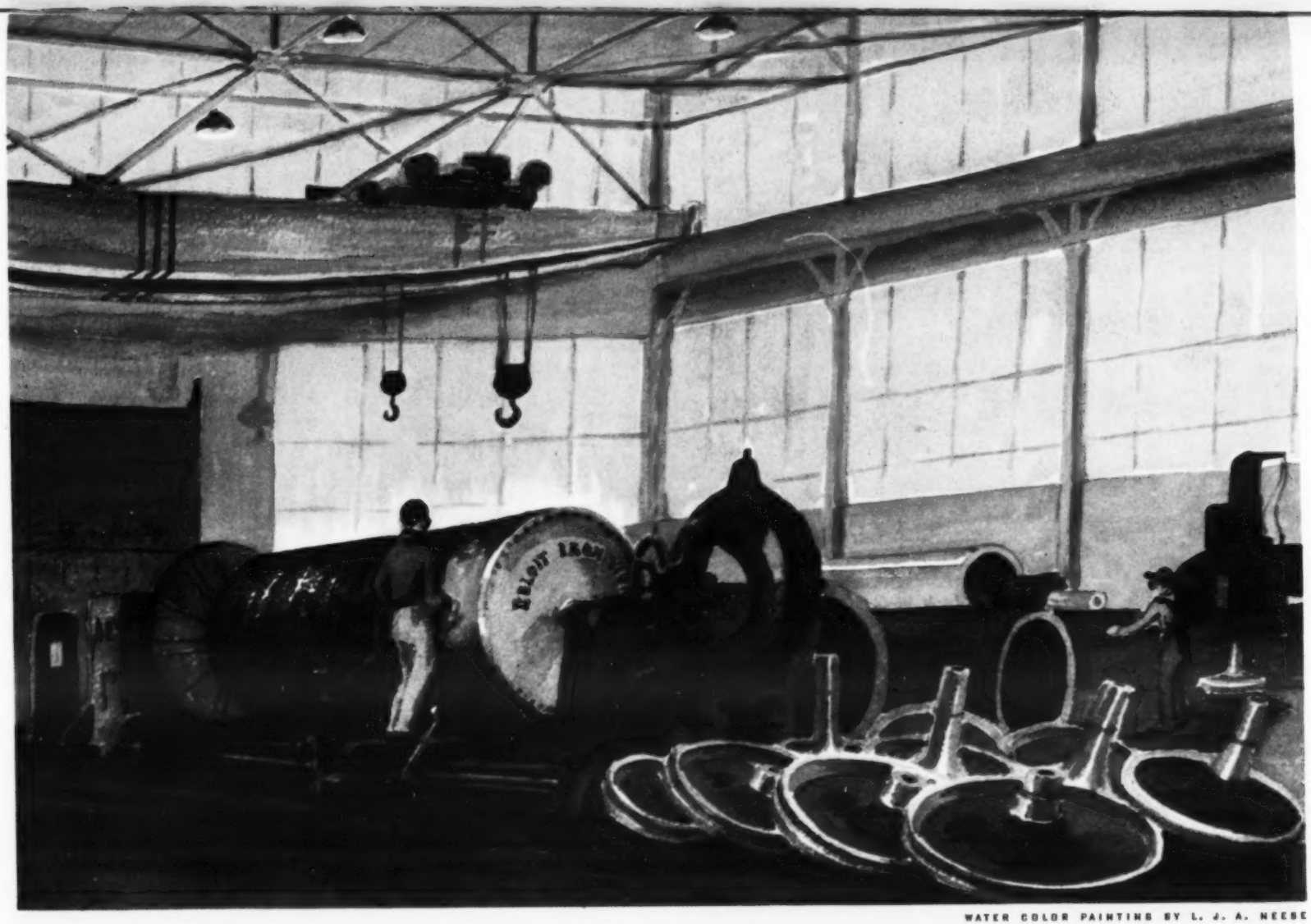
Pulp-making capacity in both the United States and Canada may exceed demand for a long time to come, according to D. W. Ambridge, president of Abitibi Power & Paper Co. Ltd. He spoke at his firm's recent annual meeting.

"It seems likely," he declared, "that there will be a period of uncertain length when it will be impossible to use the greatly increased pulp capacity 100 per cent of the time. If, however, world trade can be increased by suitable financial arrangements, this period will not be long."

Forestry Policy Criticized at British Columbia Meeting

Appointment of a five-man board to advise the government on proposed natural resources projects in British Columbia was proposed recently at the B. C. Natural Resources Conference in Victoria, B. C. The board would consist of unpaid members having no connections with any government department but being experts in their fields.

During the meeting, Prof. G. S. Allen of the University of British Columbia criticized the government for its policy of slashing the forestry department's funds in the new budget, while at the same time launching a reforestation project that, he said, would be dangerous without more research in provincial forestry. Professor Allen declared



WATER COLOR PAINTING BY L. J. A. NEESE

NEW DRYER SHOP at Beloit Iron Works is devoted exclusively to the building of paper-machine dryers—a specialized operation with each skilled machinist handling his own phase of the work. Beloit dryers are turned and bored to insure uniform drying of paper. Precision machinery, trained operators help make dependable dryers for high-speed, high-production paper machines.

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The use of Penford Gums is rapidly and widely expanding in the Paper Industry. The unusual properties of these gums as outlined below offer new and substantial advantages for calender size, size press and tub size, coating and beater addition and other paper processing.

CALENDER SIZE

To Increase Mullen, Penford Gum 280, a high fluidity starch ether is used in concentrations of from 6% to 8% solids at a temperature of 190° F. This calender application greatly increases mullen on all types of board. An average consumption is about 8# to 15# Penford Gum 280 per ton of 16 point board.

For High Gloss Ink Printing And Reducing The Penetration Of Wax, Oil, Glue, And Other Finishing Agents, the medium fluidity starch ethers such as Penford Gum 240, 250 and 260 are used. When these products are used respectively in a 4%, 5% and 6% concentration at a temperature of 130°F to 140°F, a proper finish for high gloss ink printing is developed. The results are comparable or superior to much costlier finishing agents.

For Eliminating Fuzz And Controlling Density, the low fluidity starch ethers, Penford Gum 200 and Penford Gum 240 are used. Due to their high viscosity and resultant non-penetrating properties, these products are used at concentrations as low as 1½% solids and at low temperatures.

SIZE PRESS AND TUB SIZE

The Surface may be sealed by using the surface sealing, viscous Penford Gums, or mullen and fold may be increased by using the thinner Penford Gums.

COATING

As a Coating Adhesive Penford Gum 280 is used by itself or with resins for medium-high concentration machine coatings. All Penford Gums are extremely reactive with urea formaldehyde resins and produce high pick coatings. Penford Gums 250, 260, 270 and 280 are used alone or with latex emulsions in smooth pigmented size press coatings. Coating weights from 4 to 13 pounds per ream are being produced, and these coating formulations may be water-finished on calenders if desired. The pigment may vary from clay to all titanium dioxide.

BEATER

For beater addition, the Penford Gum 200 may be used either cooked or raw. Because of the lower gelatinization temperatures of the Penford Gums, the raw starch will spell and gelatinize in many sheets as they are formed.

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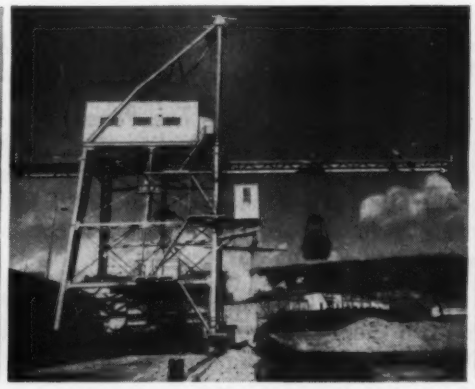
AERIAL VIEW, showing new $2,200,000 wharfing facilities and part of the Powell Lake watershed

Post-War Expansion at Powell River

THIS SPRING marked the completion of an extensive post-war modernization and expansion program at the British Columbia mills of Powell River Co. Ltd. Newsprint output has been increased by nearly 400 daily tons; while capital expenditures invested since 1945 have totaled more than $47,000,000.

The first major installation was that of a hydraulic barker and whole log chipping plant, replacing the former drum barkers and block chippers. In September 1948 the firm's eighth newsprint machine, for speeds up to 2,000 fpm, went into operation. Other major projects: an 18,000 kva generator at Stillwater, new boiler and turbo generator, speed-up of old machines, new sulfite storage and conveyor system.

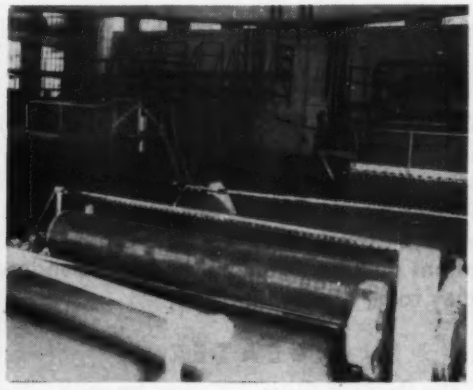
DEEP-SEA and coastal berthing are provided at the wharf; the two warehouses are designed for the storage of 10,000 tons of paper



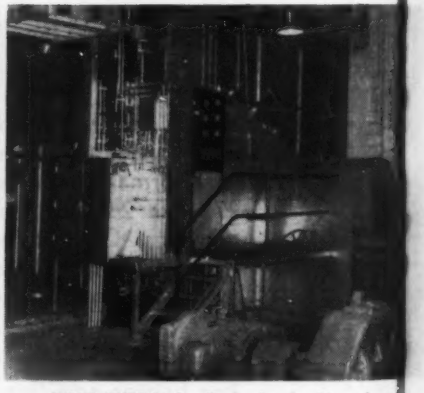
GRAB-BUCKET Colby unloader can handle approximately 835 units of hog-fuel per day; special conveyor speeds delivery to steam plant

INSTALLATION of two Waterous Great Northern grinders introduced automatic operation; blocks 64 in. long by 20 in. diam are handled

HANDLING and storage of chips has been facilitated by the construction of three concrete chip silos and conveyor system at a cost of $600,000



FOUR of eight paper machines were speeded up and modernized at a cost of $4,000,000; firm recently set record of 1,157 tons of newsprint daily



RING TYPE hydraulic barker by Hansel augments larger and smaller Weyerhaeuser types; barker mill was expanded at a cost of $1,300,000

that knowledge of B. C. forestry problems is not sufficiently advanced to start a costly program of forced reforestation.

U. S. Financing Policy Attacked by Canadian

A government member of the Ontario legislature recently attacked the United States policy of financing paper mill construction as "putting a financial squeeze on northern Ontario paper mills."

Clare Mapledoram of Fort William told the legislature's Lands and Forests Committee that mills in the northern U.S. are bidding Ontario pulpwood prices up to heights that northern Ontario mills can barely afford. American mills are able to pay high prices, he said, because many of them were financed by long-term government loans at low interest rates.

Canadian Notes

The Barge *Tahsis III*, carrying a $20,000 cargo of hemlock pulp chips, was wrecked and sunk in Welcome Pass, B. C., in March. The barge, en route to the plant of Powell

River Co. Ltd., was a former Canadian Pacific coastal steamer. She sank after striking a rock.

Corrugated Paper Box Co. Ltd.
will build a $1,100,000 plant at Calgary, Man., that will be in full operation next year, according to J. A. Whealy, president. The plant will be operated by a subsidiary, Hilton Bros.

Revised Train Freight
rates by which shippers of pulp and paper and other products in British Columbia hope to benefit will go into effect next year. Currently, rates throughout British Columbia have been much greater per mile than elsewhere in Canada because of the rugged terrain.

Appleford Paper Products Ltd.
of Hamilton, Ont., has been presented with a first award for outstanding achievement in the field of Canadian packaging. The award was made at the First Canadian Package Design Forum, which was held in Toronto.

Industry Notes

St. Regis Paper Co.
has been authorized by stockholders to go ahead with plans for exploration and development of all mineral rights on company property. Major oil firms are now operating 32 wells on St. Regis holdings in Alabama and Florida. R. K. Ferguson, president, explained that the company has no intention of setting up a subsidiary or of "going into the oil business." However, it will explore the potential and make lease arrangements with oil companies.

American Forest Products Industries Inc.
has announced the removal of its offices from 1319 18th St. N.W. to 1816 N St. N.W., Washington 6, D.C.

Hammermill Paper Co.,
Erie, Pa., has announced the consolidation of its personnel and labor relations divisions into an Industrial Relations Department. In announcing the change, S. E. Claridge, vice president, declared that Andrew J. Shaner, former labor relations director, has been named industrial relations director; Carl W. Guelcher, former assistant personnel director, has been appointed assistant industrial relations director, and Richard A. Reeves, former staff assistant in labor relations, has been made assistant to the industrial relations director.

Rayonier Inc.
at Hoquiam, Wash., suspended production for three weeks beginning April 1 because of softness in demand for cellulose by the textiles and related trades.

CONSTRUCTION BEGINS on Hoberg Paper Mills' new tunnel project undertaken as the first step toward the completion of the firm's torula yeast plant. The Green Bay, Wis., company's anti-pollution project will cost $2,500,000, the tunnel alone $373,000. It will be 3,200 ft. long and will be used to supply steam from the Division A boiler plant to operate the yeast plant; tunnel design was by Helmick & Lutz, consulting engineers of Minneapolis

$25 Million Required to Clean Up Wisconsin Streams: Conway

WISCONSIN PULP AND PAPER mills already have spent more than $15,000,000 to cut stream pollution. To complete the clean-up of sulfite pollution alone will require a total investment of at least $25,000,000, J. M. Conway, president of the Sulphite Pulp Manufacturers' Research League and of Hoberg Paper Mills, told League members in his 1952 annual report. Sulfite pollution of Wisconsin streams "is taking a beating" from the pulp mills, Mr. Conway assured the industry. He pointed out that within the past year two mills in the state have installed full-scale plants for cutting sulfite pollution to the practical minimum, and two other mills have even bigger plants under construction.

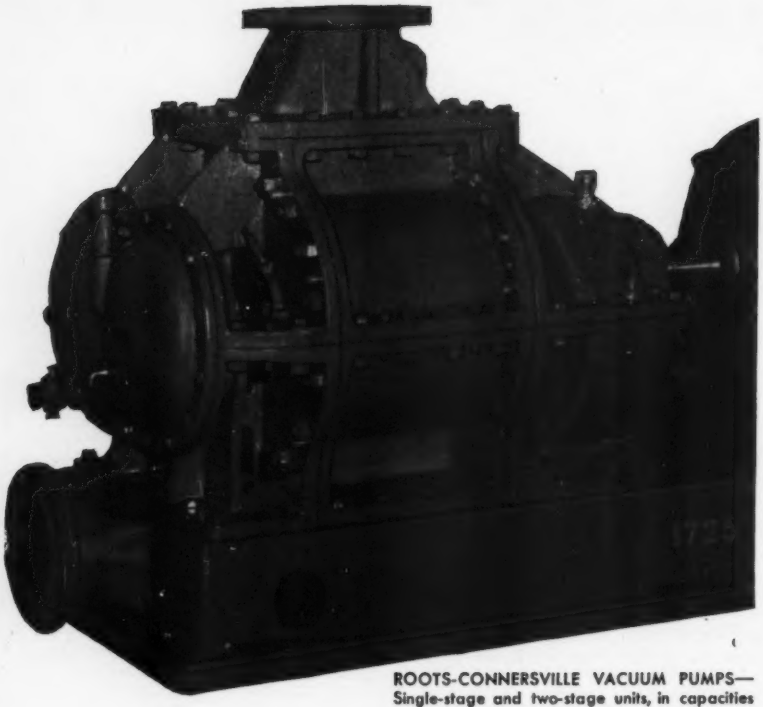
"These large, costly plants and processes do not completely solve the 75-year-old sulfite pollution problem," Mr. Conway declared. "It is not even probable that these processes could be used successfully by all member mills, for a process that fits one mill exactly may be wholly inapplicable to another mill. A successful liquor treatment process must both cut pollution and operate at a cost that the mill can support. Nobody would benefit if the mills were to adopt a pollution treatment process at a cost that would cripple the industry."

Forest conservation

Experience has forced League researchers to the conclusion that the only practical way to get rid of the large volume of material resulting from any pollution treatment process is by making this into something useful either to the mill itself or to outsiders who will pay to take it away, Mr. Conway reported. By a process of evolution, this has therefore become the direction of League research. To the extent that forest materials previously wasted in the pulping process are now converted to human use, through modern science the

Summary of Expenditures (in $1,000)
Sulphite Pulp Manufacturers Research League

Project Subject	1940-47	1948	1949	1950	1951	1952	Total
Yeast	126.5	41.4	30.8	43.6	20.7	25.7	288.7
Evaporation and burning	.....	.....	46.0	27.9	30.2	23.2	127.3
University and institutional	187.4	31.4	38.1	32.9	40.3	37.0	367.1
Trickling filter	41.4	.....	.....	.....	.....	.....	41.4
Other	82.4	10.4	27.0	25.6	47.2	53.1	245.7
TOTALS	437.7	83.2	141.9	130.0	138.4	139.0	1070.2



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industry is conserving the nation's forests while cleaning up its streams.

"...the League continues its lifelong record of devoting to research and development problems just as many dollars as the executives and scientists of the member mills believe can be spent advantageously in solving the sulfite pollution problem," Mr. Conway continued. "The year 1952 saw total outlay of the League during its 13 years pass the $1,000,000 mark, and 1953 should see this go beyond $1,200,000.

"The 1953 budget is approximately 9 percent higher than last year's expenditures, moving up to $151,000. Of $139,000 spent during 1952, $25,700 was devoted to yeast research, $23,200 to evaporation and burning, $37,000 to the various university and institutional research programs under League auspices, and $53,100 for all other projects—including roadbinder, briquetting, and biological processes other than torula.

Present status of research

The numerous phases of the League's extensive research program into the many possible uses of the sulfite liquor was summed up by Mr. Conway as follows:

Whole Liquor—*Roadbinder:* Eleven mills now have experimental or full-scale programs operating; the research grant at the University of Wyoming is being devoted to a study of the use of spent sulfite on asphalt. *Evaporation:* Two processes are under test in the League pilot plant; two mills have evaporating plants in operation, one is being installed; uses range from adhesives to chemical raw materials. *Burning:* One mill has a furnace designed to burn only concentrated spent sulfite liquor and is burning practically all that it evaporates, with sales to outside consumers; another is selling large fractions of its evaporator output and burns all the unsold concentrate over a coal bed. *Briquetting:* A research grant is in effect at the University of Wyoming; development work is continuing with leading manufacturers of briquetting machinery and with the coal trade; two successful coal processes have been developed, and one firm is currently equipping to utilize one of these processes in a full-scale operation. *Miscellaneous:* Work is currently underway in the fields of agriculture, adhesives, and dispersants.

Sugar Fraction Research—*Torula Yeast Process:* Development work being conducted at Rhinelander, with controls and further research at League laboratories; technically proved and commercially promising; more than 50,000,000 gallons of spent liquor were thus processed in 1952; possible uses include feed supplement, human nutrition, and raw material for chemical processing. *Other Fermentation Processes:* Different

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FOR UNIFORM APPLICATION OF COLOR, PLASTIC & ADHESIVE

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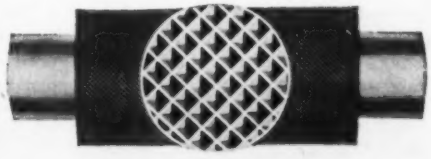
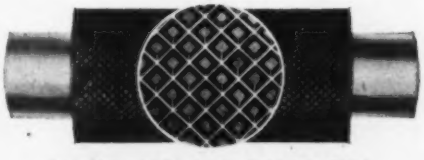
Electronic controlled precision engraved applicator rolls produce finer and more uniform coating.

A New Scientific Engraving Control Engineered by the Pioneer Producers of Precision Engraved Applicator Rolls



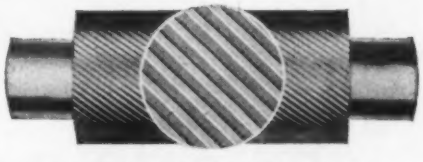
PYRAMID SHAPE CELL

Most generally used for light and medium application of color or coating on aniline printing machines, where the color or coating is transferred from the fountain roll to the plate or coating roll without the use of a doctor blade. Percent of dry solids in material applied determines size and depth of engraved cell.



QUADRANGULAR SHAPE CELL

Basically a gravure type cell, best suited for coloring or coating on gravure machines, or other direct application equipment using a doctor blade. The predetermined size and depth of the precision engraved cells produces uniform application. Precision engraved cells of a predetermined size and depth are available for almost any direct application.



TRIANGLE-HELIX SHAPE CELL

This scientifically engineered cell is used for heavy application of color and coating, on machines employing a doctor blade. The Triangle-Helix Shape Cell has solved many complicated coating and coloring problems. The depth of the engraved cell and weight of applied coating is determined by the percent of dry solids in solution.

MODERN ENGRAVING & MACHINE CO.

World's Largest Producers of Precision Engraved Applicator Rolls

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EXPANSION OF THE PULP AND PAPER curriculum at the University of Alabama's school of chemistry has been made possible through a $35,000 contribution from Gulf States Paper Corp. In the picture at the left Mrs. Mildred W. Warner, president of Gulf States, is shown discussing the expasion with John M. Gallalee, university president (left), and Dean of Chemistry R. D. Brown; at the right, Robert Fuller, Gulf States quality control director, watches as Chester Deas runs off a chemical test

fermentations yield end products as different as fuel gases, plastic intermediates, and synthetic rubber ingredients; work is being done "along more promising lines." *Basic Research on Sugars:* Long-range project is now in its second year under the direction of a sugar chemist.

Lignin Fraction Research—*Chemical Derivatives:* Vanillic acid derivatives have been clinically tested by several medical research groups, with promising results in treating some diseases that are usually fatal. *Insolubilization:* Study is underway to render lignin insoluble in water without decreasing its adhesives qualities.

Membership

Firms that are members of the League are as follows: Badger Paper Mills, Consolidated Water Power & Paper Co., Detroit Sulphite Pulp & Paper Co., Falls Paper & Power Co., Hoberg Paper Mills Inc., The Kansas City Star Co., Kimberly-Clark Corp., Marathon Corp., Marinette Paper Co., Nekoosa-Edwards Paper Co., Northern Paper Mills, Rhinelander Paper Co.

Officers in addition to Mr. Conway include Folke Becker, president of Rhinelander Paper Co., vice president; Cola G. Parker, president of Kimberly-Clark Corp., treasurer, and John C. Strange, vice president of the Institute of Paper Chemistry, secretary. Henry A. Rothchild, assistant to the vice president for manufacturing of Kimberly-Clark, is chairman of the technical committee; N. L. Malcove, technical superintendent for Northern Paper Mills, is secretary.

Kalamazoo Valley Pollution Progress Report Studied

A progress report on the pollution-control activities of paper mills in the Kalamazoo River valley has been submitted to the Michigan Water Resources Commission. It was in part occasioned by a request from Kalamazoo Paper Co. for a one-year extension of the state deadline for abating pollution.

Late in October 1952 the commission adopted orders against Kalamazoo Valley mills. The Monarch Division of Allied Paper Mills was given until October 1, 1953, and the King Division until September 1, 1955, to complete disposal control systems. For the others a deadline of June 1, 1953, was set. The City of Kalamazoo is under commission orders to have a disposal plant in operation by June 1.

The progress report, released by Chief Engineer Lorin F. Oeming, is as follows:

Allied Paper Mills, King Div.: Planning has not progressed beyond preliminary stages, since principal efforts are being directed toward completion of the Monarch Division installation.

Allied Paper Mills, Monarch Div.: Construction is underway on a treatment system, the plans for which were approved April 29, 1952; approval on remainder is pending; project scheduled for completion before the expiration date set in the order.

Hawthrone Paper Co.: Some interval mill changes have been made; no planning underway; compliance with plan date uncertain.

Kalamazoo Paper Co.: Plans for the facilities to treat de-inked wastes from Mill No. 2 have been completed, with construction well advanced. Plans have not been submitted for the collection and delivery of waste in the treatment unit. The system is expected to be in operation by July 1953, approximately a year in advance of the date established in the order. Plans for meeting the restrictions on paper processing wastes at No. 2 Mill remain to be developed. Planning on waste control measures for Mills No. 1 and 3 has not progressed beyond the preliminary stages.

Kalamazoo Vegetable Parchment Co.: The company's approach to compliance is by way of recovery practices and internal mill changes; no detailed construction plans have been developed, but a description of methods and equipment to be installed in lieu thereof is being prepared in anticipation of the due dates.

Mac Sim Bar Paper Co.: Preliminary design and plans have been received and were tentatively approved May 16, 1952; final detailed construction drawings are reported to be near completion; submission by the due date is indicated.

Ostego Falls Paper Mills Inc.: Planning is well advanced; installation of waste control facilities incorporating recirculation and reincorporating principles is underway; compliance with the plan date is indicated.

Rex Paper Co.: Accomplishment has been limited to a survey of a site for waste treatment facilities; no work being done on plans for the treatment system; submission of plans by due date is uncertain.

St. Regis Paper Co.: The local manager has not received authorization from company officers to prepare and submit plans; however, he is proceeding on his own responsibility and is preparing a plan to be submitted by the due date.

Sutherland Paper Co.: Planning is well advanced; compliance with the plan date is indicated.

Anti-Pollution Legislation

Legislative activity in the various states regarding anti-pollution measures has been stepped up with all but four states scheduling regular sessions of their respective legislatures. Bills that are of particular interest to pulp and paper firms are as follows:

Connecticut: a bill appropriating $50,000 for remedial steps to prevent further pollution of the Housatonic River; *Maine:* bill requiring the state water improvement commission to submit to the state legislature recommended classifications that it considers to be in the best interest of all concerned, after which action by the legislature would be required to make such recommendations into law, and *Wisconsin:* bill providing for accelerating amortization on waste treatment plants and providing property tax relief on such facilities. In the *national picture*, Federal Bills H.R. 2535, H.R. 234 and H.R. 606 provide for accelerated amortization of expenditures for waste treatment works.

Trash Hardwood Seen as Upper Michigan Problem

An invasion of trash hardwoods is lowering the overall quality of conifer swamp forests in upper Michigan, according to a recent report issued by the Lake States Forest Experiment Station. The swamp forests occupy approximately 1,250,000 acres in upper Michigan and are an important source of pulpwood for five paper mills in the area.

The report stated that new forest stands with an increasing proportion of inferior hardwoods are becoming estab-

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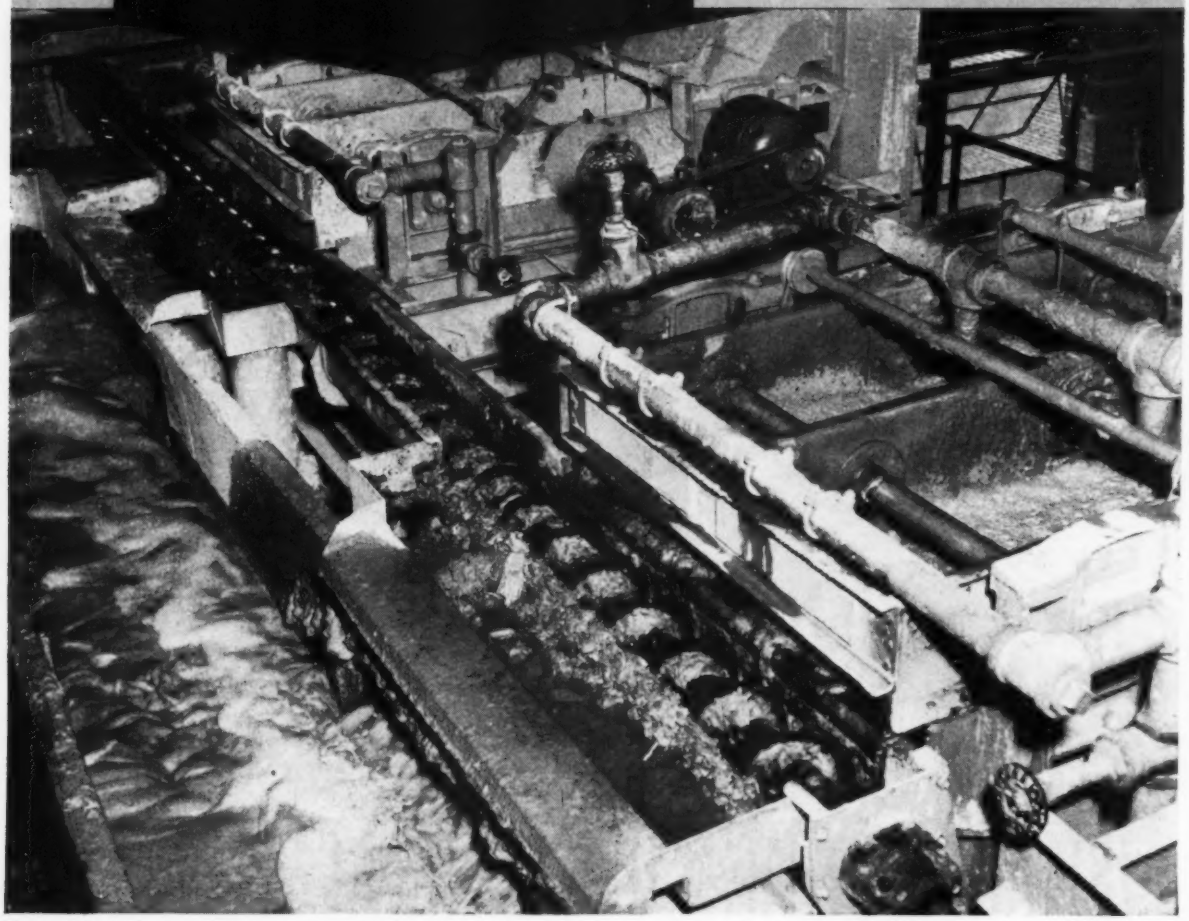
Bird Jonsson Screens are standard for knotting ahead of brown stock washers. They increase washing efficiency, maintain better vacuum and assure maximum recovery of black liquor.

Bird Jonsson Screens are equally effective on waste paper or deinked stocks, on straw stocks, and stock from refiners or defibrators.

Ask for recommendations and estimates.

BIRD MACHINE CO.
South Walpole, Mass.



These Bird Jonsson Screens are handling old paper stock, removing all unwanted matter — wet strength paper, cellophane, rubber bands, paper clips, etc. with almost no loss of good fibres

lished on the cutover swamps under present logging practices. Zigmond A. Zasada, station research forester, has recommended further study of timber harvesting methods to protect the conifer reproduction. Cooperating with the station foresters were personnel from Bonifas Lumber Co., Neenah, Wis.; Northern Paper Mills, Green Bay; Cleveland Cliffs Iron Co., Negaunee, Mich.; Escanaba Paper Co., Escanaba, and the Michigan Conservation Department.

Approximately $43,726,500

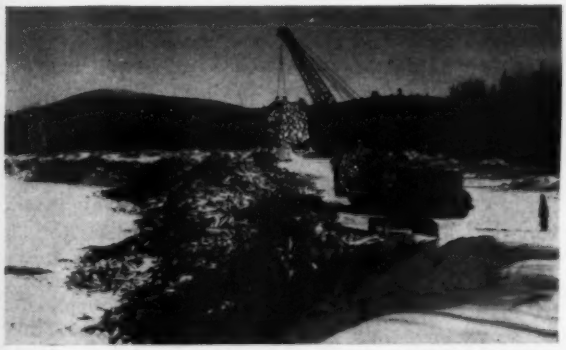
in national forest receipts was deposited in the U. S. Treasury by the Forest Service during the last six months of 1952. This represents an increase of $1,936,354 over funds taken in for the same period a year ago and establishes a new record. More than 94 per cent of the receipts for the period ending December 31 was collected from the sale of timber.

A Record for Mass Planting

of seedlings has been announced by Gaylord Container Corp. at Bogalusa, La. During the planting season just closed, Gaylord planted some 18,630,000 seedlings on 24,770 acres in Louisiana and Mississippi.

PUSHING SNOW aside with Caterpillar bulldozer to allow trucks to back in for fast loading

MECHANICAL METHOD of loading wood trucks at Millsfield; Schield Bantam crane does the work



LEASED CRANE ready to drop load of logs onto ice in Magalloway River for floating to mill

EVEN WITH MODERN equipment, some woods operations still require trained teams of horses

Mechanized Woods Operations Solve Brown Co. Transport Problems

MODERN MECHANICAL devices are speeding up the woods operations of Brown Co., Berlin, N. H. In every possible way the out-moded methods of wood handling are being replaced by fast and efficient equipment of the latest design.

The firm's woods operation is large and widely scattered. It is an operation that requires a great deal of planning, scheduling, and "know-how." The planning is directed at one principal goal: to speed the wood to mills, rivers and lakes as efficiently as possible.

At the Millsfield operation mechanical loading equipment is used almost entirely. Wood is loaded by a small mobile crane mounted on half tracks. The large wood is loaded with tongs, while the small wood is bundled and loaded with cable. In the past, the operation was entirely by hand with the aid of the pulp hook.

Hardwood by highway

Since hardwood will not float without special treatment, it has been necessary for Brown to increase delivery to the mills via highways. And with the increased use of hardwoods for the manufacture of pulp and paper the rate of delivery has had to be speeded appreciably.

To solve this transportation problem, the firm has stepped up its road-building program and now boasts, among other roads, a 22-mile year-round woods highway in the Parmachenee area that allows huge diesel tractor-trucks to enter heavily wooded areas that were previously not practical to log due to the great distances involved. When the diesels arrive at their destination, an empty trailer is disconnected and a loaded trailer is attached in a matter of minutes. Other types of trucks are speedily loaded as they arrive.

Brown Co. wood handling is on a 24-hour-a-day basis, with most of the maintenance being done at night by mechanics of U-Dryvit System at Cascade. Other repairs are made at a specially designed garage at the Long Pond camps on the Parmachenee Road. With more than 200 trucks busy night and day, maintenance has been given added attention. The garage is equipped to handle both trucks and tractors and can accom-

modate vehicles in trouble anywhere along the forest road.

Field telephones have been placed strategically so that drivers in need of assistance can contact repair stations at any time of the night or day.

Largest in the Northeast

The company's woods transportation operation is the largest in the Northeast, hauling in excess of 2,000 cords per day to a number of destinations and over miles of highway. Approximately 200 miles of road, both permanent and for winter travel only, were opened by Brown for this season's operation.

That there are many advantages in the modernization of woods operations has been summed up by a Woods Department official: The faster wood can be loaded and unloaded, the more time the truck operator can spend on the road—and that's where he makes his money. At the same time, the faster the wood can be delivered to the mills, the more it will help the company—and that's one of the ways that the company makes its money.

Spraying Target for 1953: 1,000,000 New Brunswick Acres

A FLEET OF 75 AIRPLANES—believed to be the largest air force ever mobilized for a peaceful task in Canada—is being assembled in various parts of the continent. At the same time, huge quantities of insecticide and other supplies are being moved to five airfields recently cleared in New Brunswick in preparation for a multi-million dollar forest conservation project.

Target of the 75-plane force will be 1,000,000 acres—more than 1,500 square miles—of New Brunswick forest infested by the budworm, an insect that attacks and destroys balsam fir and spruce, valued raw material for pulp and paper and lumber products.

About 500,000 of the 1,000,000 gallons of insecticide that will be used to spray the forest have already arrived at the airfields, according to B. W. Flieger, manager of Forest Protection Ltd. He estimated that the total cost of the project now being undertaken may reach several million dollars, as it may be necessary to spray another million acres in 1954 and additional areas in subsequent years. The federal government has agreed to contribute to the province ⅓ of the cost of spraying 2,500,000 acres.

Maneuverability and power

A pioneer Canadian bush flying outfit, Wheeler Airlines of St. Jovite, Que., has the contract for the DDT spraying project. So large is the job, however, that it will be impossible to find all the necessary planes of the required type in Canada. Wheeler plans to obtain approximately 20 from Canadian sources, the remaining 55 are known to be available in the United States.

All aircraft will be rugged biplanes with the required maneuverability and power necessary to carry out spraying in hilly country such as is found in northern New Brunswick. Special spraying booms and tanks for the insecticide solution are required for each plane.

Major supplier of aircraft for the operation will be Central Aircraft Inc. of Yakima, Wash. A. L. Baxter, president of Central, has announced that his firm's forest sprayers were to start the long ferry flight—approximately 3,400 miles—on or about May 1. Central will provide between 55 and 60 airplanes for the job. The craft will be 450 hp Stearmans. Part of the Central fleet will come from Texas, Arizona, Louisiana, California, Oregon, and Washington.

Canadian operators expected to take part under the Wheeler contract are Leavens Bros. Air Service, Toronto; Skyway Air Services, Langley Prairie, B. C.; Aviation Services, Moose Jaw, Sask., and Bradley Air Services, Carp, Ont.

"Budworm City"

The actual spraying will take place in late May or early June, when the insecticide has the maximum killing power against the budworm. However, preparations actually began last fall, when bulldozers cleared the sites of the five airfields that will be used in addition to the "Budworm City" airstrip that was constructed last year. The airfields are situated some distance from railhead, and the million gallons of insecticide have to be trucked over winter roads that will be made impassable by spring thaws. The airports are located at Kedgwick, Nictau, Boston Brook, Rosehill, and Charlo, forming a large arc around the original "Budworm City," which is itself situated south of Campbellton, N. B.

The personnel required for many specialties is being recruited throughout the country, Mr. Flieger reported. W. H. Irvine, on leave from the Department of Transport as supervisor of airways, is aviation consultant to the project. Science Service of the Department of Agriculture will be responsible for the important biological control phase of the work.

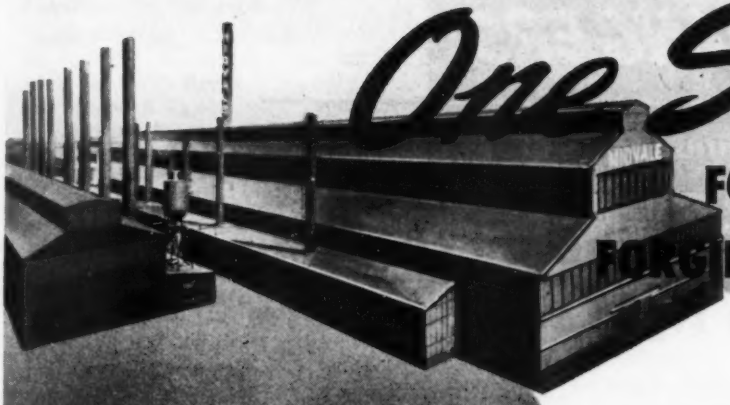
Decision to undertake the project was based on the success achieved last year in "Operation Budworm," when 200,000 acres of New Brunswick forest were sprayed. That operation was carried out jointly by the New Brunswick government and New Brunswick International Paper Co.

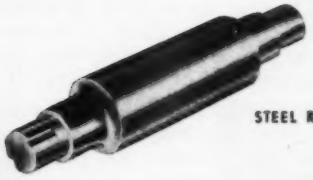
Forest Protection Ltd., which is organizing the present campaign, is a co-operative, non-profit corporation formed by the provincial government and four pulp and paper firms: Bathurst Power & Paper Co. Ltd., Fraser Companies Ltd., New Brunswick International Paper Co., and Irving Pulp & Paper Co.

UP TO 85,000 young trees per day can be planted by this five-row, full bed transplanting machine that has been developed by Nekoosa-Edwards Paper Co. at Port Edwards, Wis.; the machine is now in operation at the Nepco nurseries and replaces three two-row transplanters that are now obsolete; built around an Allis-Chalmers Model G tractor, the unit requires a six-man crew; it was designed and built by Harry Liebig, chief mechanic at the nurseries

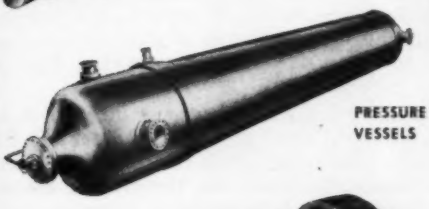
One Source

FOR "SPECIFICATION" FORGINGS AND CASTINGS

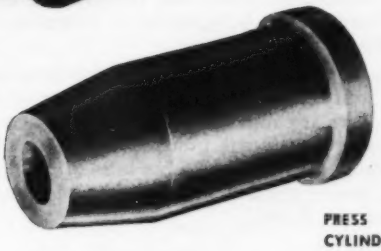




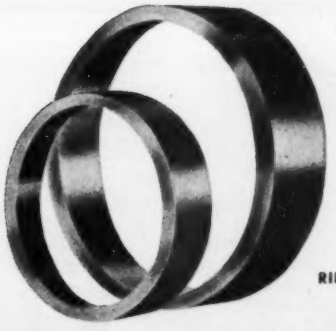
STEEL ROLLS



PRESSURE VESSELS



PRESS CYLINDER



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To effect such economies . . . to set such production records — great care has been taken by Sutherland Refiner Corporation, the designer, and Valley Iron Works Company, the builder, not only in the construction of this machine, but in the selection of its key accessories. The oil coolers, for example.

Controlling the temperature of lube oil in all 34" Sutherland units are Ross Type BCF Exchangers. Heavy-duty roller and Kingsbury thrust bearings do not run the risk of seizure here. *Overheating is dependably prevented with Ross Exchangers.*

This same dependable protection is provided throughout the paper and pulp industry. Ross Exchangers are standard equipment on: engines, calenders, centrifugal pumps, drying machines, rewinders and grinders . . . as lube oil coolers, as jacket water coolers and to control hydraulic fluid temperatures.

With a broad range of pre-engineered, fully standardized designs, and featuring enduring copper and copper alloy construction, Ross Type BCF Exchangers have gained wide acceptance in *every* industry. To find out more what these rugged and dependable units can do for you — write for Bulletin 1.1K5.

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Food Machinery & Chemical Acquires English Firm

Food Machinery & Chemical Corp. of San Jose, Cal., has acquired controlling interest in Varley Pumps & Engineering Ltd. of Brentford, Middlesex, England. The English firm produces gear-type pumps used principally for pressure lubrication service, for circulating machine tool coolants, and on tank trucks for unloading.

According to FMC, the Varley firm provides manufacturing facilities in Great Britain for several of the regularly produced domestic lines, such as Peerless pumps, John Bean agricultural sprayers, and canning and food processing machinery.

'52 Frasch Sulfur Production Up

Frasch sulfur producers turned out 5,293,145 long tons in 1952, a slight improvement over 1951 levels, according to an announcement from the Interior Department. During the year badly depleted stocks were built up somewhat—from 2,837,432 tons to 3,068,855 tons at the end of December.

Production of several leading firms was as follows: Texas Gulf Sulphur Co., 2,957,557 tons; Freeport Sulphur Co., 1,691,995; Jefferson Lake Sulphur Co., 405,383, and Duval Sulphur & Potash Co., 238,210.

Production of recovered sulfur at gas treatment plants increased from 184,013 long tons in 1951 to 248,076 tons in 1952. A further increase in the recovery of this type of sulfur is expected in the coming year, the department said. Stocks totaled 94,662 tons.

Two firms have recently announced projects that will boost United States production. American Sulphur & Refining Co., formed more than a year ago to "develop a process for the extraction of elemental sulfur from native volcanic sulfur-bearing ores," is building its first commercial plant near Fillmore, Cal. The operation is to be in production in the early fall and will produce a daily 100 tons of 99.5 per cent quality sulfur. Standard Sulphur Co. will begin construction on a $450,000 sulfur extraction plant in Brazoria County, Texas. Initial estimated production will be 100 to 150 tons daily.

Materials Handling Show to Attract 25,000

The materials handling industry will assemble more than 3,000 experts on every phase of handling to answer visitors' questions during the five-day run of the National Materials Handling Exposition at Convention Hall, Philadelphia, May 18-22. An additional group of 42 experts associated with firms that use handling equipment will lead three days of discussions at a conference conducted by the American Material Handling Society.

Some 25,000 visitors from 40 countries are expected to attend the show, which will be the largest industrial exposition to be held anywhere during 1953 and the largest ever held in Philadelphia.

Conference topics will include: "Handling in Process," "Warehousing and Shipping," "Packaging for Improved Handling," "Bulk Handling," and "Requirements for Organization, Study and Anaylsis."

Combustion Engineering-Superheater Changes Name

Stockholders of Combustion Engineering-Superheater Inc., at their annual meeting April 14, voted to shorten the company name to Combustion Engineering Inc.

At the same time the board of directors elected the following officers to new posts: Joseph V. Santry, president, was elected chairman of the board and will continue as chief executive officer; Samuel G. Allen retired as chairman of the board but will continue as chairman of the executive committee; Martens H. Isenberg, executive vice president, was elected president to succeed Mr. Santry; George D. Ellis, vice president and controller, was named vice president in charge of finance, succeeding Harold H. Berry, who has reached the retirement age. Mr. Berry will continue as a director.

Moul Acquires Sole Ownership of S. C. Rogers

Sole ownership of the 66-year-old Samuel C. Rogers & Co. of Buffalo has been acquired by Arthur F. Moul, who was once a salesman for the firm. Mr. Moul has held an approximate one-third interest in the company and recently purchased the interest held by Oliver F. Cabana and Lloyd Mansfield.

Mr. Cabana has been president and Mr. Mansfield, who is head of the Lloyd Mansfield advertising agency, secretary. Mr. Moul has been vice president and general manager of Rogers & Co. since 1933. He joined the firm as a salesman in 1925.

In addition to Mr. Moul, who is to be president, new officers will include R. Douglas Campbell, a Buffalo certified public accountant, treasurer; and Mrs. A. J. Miller Jr., secretary.

S. C. Rogers was founded in 1887 and employs about 50 people. Its products include machinery for sharpening industrial knives and saws and "face" grinders for industrial machining operations. In the past year the firm has developed seven new types of grinders that will be used in such industries as pulp and paper, steel, metal-working, textile, lumber, wood-working, and the graphic arts.

A. F. Moul

H. W. Beck

Beck Appointed by Morden

HERBERT W. BECK has joined Morden Machines Co. of Portland, Ore., as sales manager. Mr. Beck had been with the National Aniline Division of Allied Chemical & Dye Corp. for 19 years. Since 1946 he has been resident manager of the Portland branch, serving the Pacific Northwest, Alberta and British Columbia. A graduate of the Polytechnic Institute of Brooklyn, Mr. Beck is a member of Tappi and the Superintendents Association.

E. D. Jones Acquires Manufacturing Rights for French Screen, Filter

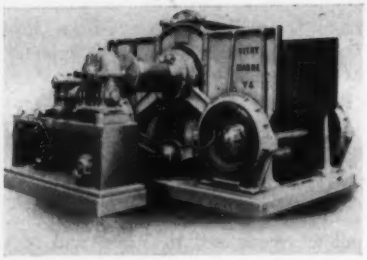
E. D. Jones & Sons Co. of Pittsfield, Mass., has completed arrangements to manufacture and distribute in North America two new machines under original patents held by E. & M. Lamort Sons, Vitry-Le Francois, France. The announcement was made by S. Harley Jones, president of the Massachusetts firm.

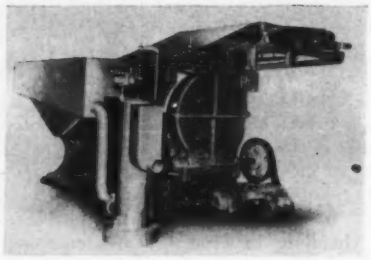
The machines, known in Europe as the Lamort high-frequency screen and the Lamort cellular filter, have been the subject of lengthy study by the Jones engineering staff, which will adapt the equipment to the American market.

R. E. Bodette

N. F. Hoch

The high-frequency screen, while based on principles already in use in some North American mills, incorporates a number of mechanical features new to such equipment. According to Jones, the Lamort has a simple means of





VIBRANT SCREEN (left) and cellular filter that E. D. Jones & Sons Co. will manufacture in this country under rights acquired from E. & M. Lamort Sons of France

adjusting the intensity of stroke without taking the unit completely apart; the shock absorption mechanism eliminates vibration on vat and foundation. There are no vibrating elements passing through the stock. The machine, Jones states, can be taken apart in subassemblies in less than 60 minutes without moving drives.

The drum size of the Lamort screen is about 40 in. by 40 in. The drum speed may be varied from 0.5 to 3.5 rpm and vibrates at about 1,430 per minute. Total connected horsepower is approximately 7.0

Cellular filter

The cellular filter can be used for white water, raw water or pulp thickener. According to a description released by Jones, peak efficiency is maintained under all conditions—normal load or surges from the machine; the space requirement is small; operation is completely automatic, and the density of stock recovered is high—from 5 to 10 per cent as required—when used on white water; wire life expectancy is from nine to 12 months, and the filter requires no chemicals, as its action is strictly automatic.

Two men have been appointed project engineers. Richard E. Bodette is in charge of filter development, while Norman F. Hoch is responsible for the screen. Mr. Bodette was at one time beater room superintendent for the St. Regis Paper Co. plant at Deferiet, N.Y.; prior to that he was beater room engineer for Consolidated Water Power & Paper Co. at Wisconsin Rapids, Wis. Mr. Hoch spent four years at Spruce Falls Power & Paper Co. at Kapuskasing, Ont., where he was design engineer, and seven years as plant engineer at Alliance Paper Mills, Merritton, Ont.

Jones announced in April that it would import immediately a screen and filter manufactured by Lamort and would install them for observation and demonstration at a mill close to Pittsfield. The first units of the Jones-designed version are expected to be completed before the end of the year.

Changes Announced by B&W

W. H. ROWAND, chief engineer of the Boiler Division of the Babcock & Wilcox Co., has been elected a vice president of the firm. He will continue in the post of divisional chief engineer.

Mr. Rowand joined B&W in 1929. During the 1930s he was active in the development of the cyclone spearator, which effected a thorough separation of steam and water in boiler drums, and in subsequent developments in higher temperature and higher pressure boilers.

In other B&W changes, *J. E. BRINCKERHOFF,* formerly sales manager of the Refractories Division, has been named divisional general manager. And, *M. NIELSEN,* who was elected a vice president of the firm April 1, has been placed in full charge of the manufacturing department of the Boiler Division. He was at one time superintendent of production at the Barberton, Ohio, plant and last year was named an assistant vice president in the manufacturing department.

Additional Refractories Division appointments are as follows: *C. L. NORTON JR.,* executive assistant in charge of all development and engineering activities; *CARL CLAUS,* executive assistant in charge of all sales and manufacturing operations; *MARK J. TERMAN,* sales manager; *BRADFORD HOOPER,* technical director, and *ROYCE K. MACK,* superintendent of the Augusta (Ga.) works.

W. H. Rowand

D. B. Chapman

DAN B. CHAPMAN of Appleton, Wis., has been named exclusive agent for the distribution and sale of the Fulton roll press in the north central region. The announcement was made by Fulton Iron Works Co. of St. Louis. He was formerly associated with Appleton Machine Works.

Stebbins Expands Service

Complete field and shop service for the installation of Saran rubber and Tygon linings throughout the United States and Canada has been announced by Stebbins Engineering & Mfg. Co. The firm is licensed applicator for the materials. According to the company, the addition of Saran rubber and Tygon further increases Stebbins' ability to meet requirements for acid and alkali resistant linings in process equipment.

According to Edward F. Tucker, president, shop facilities have been established at the Watertown, N.Y. plant, while field crews are available for installation anywhere in North America.

Huyck President Confident of New England's Future

A strong vote of confidence in the future of New England as a textile manufacturing center has been voiced by Grenville R. Holden, president of F. C. Huyck & Sons, Rensselaer, N.Y. He spoke in connection with the first anniversary of Huyck's acquisition of America's oldest manufacturer of woven industrial cloth, The Joseph Noone's Sons Co. of Peterborough, N.H.

The Noone firm, which was founded in 1831, became an integral part of Huyck at a time when the exodus of the textile industry from New England was at its peak. By its action, Mr. Holden declared, Huyck not only expressed its confidence in the region but also provided itself with the means for entering the broad field of industrial textiles.

Heading the operations in this newly-expanded industrial fabrics program is Frederic A. Soderberg, recently elected a vice president of Huyck.

Allied Notes

The Black-Clawson Co.

and the Shartle Bros. Machine Division, both of Middletown, Ohio, will shut down for two weeks' vacation and maintenance repairs from July 19 through August 2. During that period no shipments will be made from either plant except in extreme emergencies.

The Foxboro Co. Ltd.

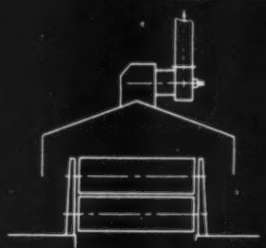
has recently opened a completely equipped shop for the servicing and repair of Foxboro instruments in Vancouver, B. C.

The Lunkenheimer Co.

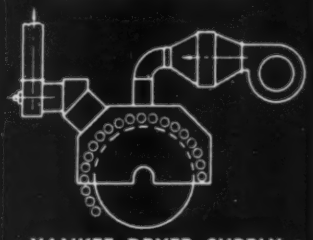
of Cincinnati recently staged a two-day conference to review new developments in the manufacture of valves. Distributor sales representatives from five eastern

NEWCOMB-DETROIT

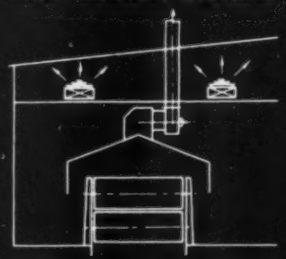
PIONEERS IN INDUSTRIAL VENTILATION



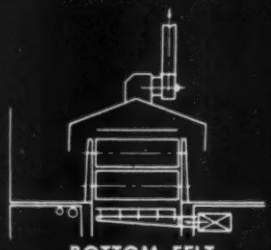
PAPER MACHINE EXHAUST SYSTEMS



YANKEE DRYER SUPPLY AND EXHAUST SYSTEMS



MACHINE ROOM ROOF SUPPLY SYSTEMS



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Newcomb-Detroit since 1912 has through constant research, progressive designing, modern manufacturing methods and installation experiences developed heat and air systems that today are the finest available to the pulp and paper industry. Expertly designed, manufactured and installed Newcomb-Detroit heat and air systems will increase the productive capacity of your manufacturing equipment and improve product quality.

Wide variety of equipment, capacities and facilities available at Newcomb allow absolute freedom in making proper selection of equipment and methods to most efficiently handle your production problems. You will find at Newcomb the answer to your problem whether it be for a single piece of equipment or a completely engineered and installed system. For all of Newcomb facilities, experience and engineering services are waiting your call.

ADDITIONAL APPLICATION AREAS

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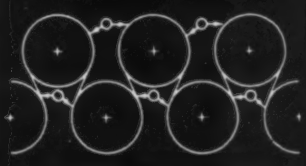
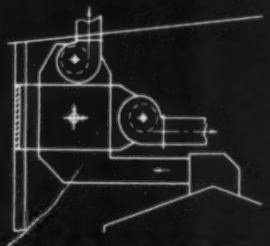
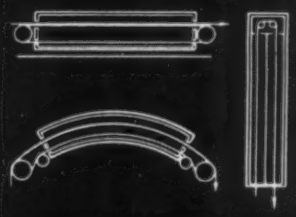


VAPOR ABSORPTION SYSTEM



PULP & MOLD DRYERS



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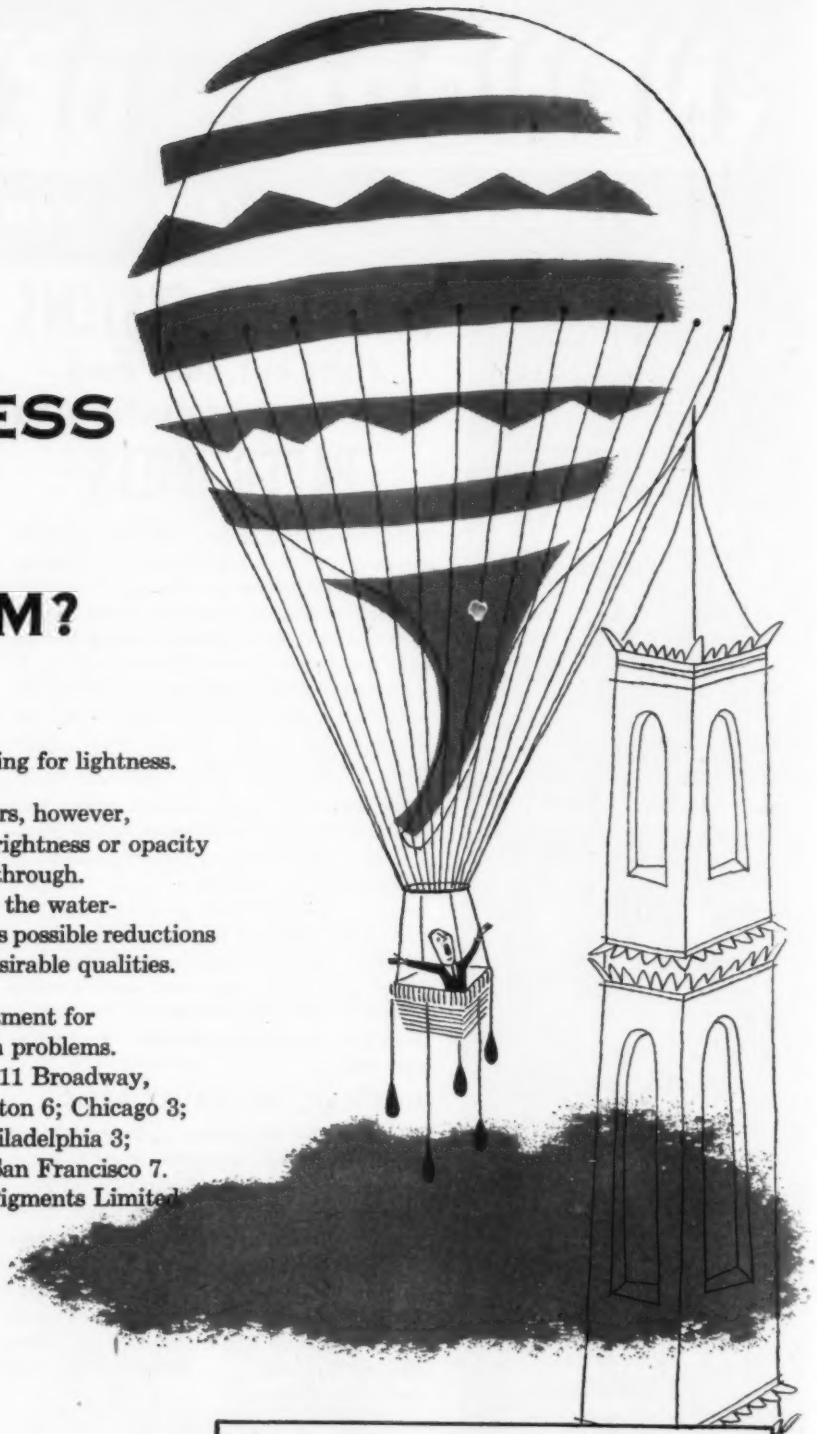
LIGHTNESS YOUR PROBLEM?



In this spot you'd sacrifice anything for lightness.

Reducing weight in printing papers, however, can be done without sacrificing brightness or opacity and without an increase in show-through. Pigmentation with TITANOX-AWD, the water-dispersible titanium dioxide, makes possible reductions in weight while retaining these desirable qualities.

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Subsidiary of NATIONAL LEAD COMPANY

150,000th FORK-LIFT truck manufactured by Clark Equipment Co. of Battle Creek, Mich., leaves the assembly line; inspecting the unit are (l to r) R. H. Davies, vice president in charge of production; W. E. Schirmer, vice president in charge of industrial truck sales, and George Spatta, president

and central states and two Canadian provinces attended.

Builders Iron Foundry
of Providence, R. I., has acquired an additional 87,000 sq. ft. of manufacturing space. The move is the second expansion undertaken by the firm since 1949.

Industrial Equipment Co.
of Chicago, manufacturer of cranes and monorail systems, has announced that the firm name has been changed to Industrial Crane & Hoist Corp.

Monsanto Chemical Co. and Heyden Chemical Co.
have entered into an agreement to build a methanol plant adjoining Monsanto's new acetylene facilities at Texas City, Texas. Methanol is an important raw material in the production of formaldehyde, hexamethylenetetramine and pentaerythritol.

Pennsylvania Salt Mfg. Co.
has announced that Henry S. Rondeau and Cleveland Industries Co. have been appointed representatives for Pennsalt's corrosion engineering products in Ohio and northern Kentucky.

Newark Wire Cloth Co.,
Newark, N.J., has announced the purchase of the entire business hitherto carried on by Cosgrove Wire Cloth Co. Inc. of Belleville, N.J. The plant will continue operations under the long-established name as a subsidiary of Newark.

American Cyanamid Co.
is now producing PAREZ resin 614 at its Charlotte, N.C., plant. PAREZ resin 614 is a liquid cationic urea-formaldehyde resin used to impart wet-strength and dry-strength qualities to paper products.

Allied Chemical & Dye Corp.'s
General Chemical Division will build a large research laboratory at Morristown, N.J., to permit an expanded laboratory research program. The unit will replace the laboratory at Laurel Hill, L.I., N.Y.

Kolker Chemical Works Inc.,
with plants in Newark, N.J., and Houston, Texas, has changed its name to Diamond Alkali Organic Chemicals Division Inc. The firm is a subsidiary of Diamond Alkali Co.

Food Machinery & Chemical Co.
announced recently in San Jose, Cal., the acquisition of Kingsbury-Davis Machine Co. of Contoocook, N.H., a manufacturer of specialty machinery used in the production of paper boxes.

Clark Equipment Co.'s
Industrial Truck Division will unveil its version of the "Fork Truck of the Future" at the 5th annual National Materials Handling Exposition, which is to be held May 18-22 at Philadelphia.

Reichhold Chemicals Inc.
is now producing formaldehyde—50,000,000 pounds annually—by a new process at the Seattle plant. The plant will serve as a pilot plant for the construction of future formaldehyde producing units at installations in Detroit and at projected sites in the South. Simultaneously, Reichhold has acquired a substantial interest in Watson-Park Co. of Ballardvale, Mass., a formaldehyde producer. RCI also operates a 60,000,000-pound plant at Tuscaloosa, Ala.

Davison Chemical Corp.
is including a plant for the production of sodium silicate in both solid and solution forms as a part of its new facilities at Lake Charles, La.

Ohio Injector Co.
of Wadsworth, Ohio, has acquired the lubricated plug valve business of H. K. Porter Co. of Tulsa, Okla. The production equipment will be moved to the Ohio plant.

Clark Equipment Co.
of Buchanan, Mich., and Ross Carrier Co. of Benton Harbor have entered into an agreement whereby Clark would acquire the capital shares of Ross. The latter firm manufactures straddle trucks, power shovels and excavating equipment, and fork lift trucks.

The Permutit Co.
has moved its Los Angeles sales office to a new location: 302-B South Brand Blvd., Glendale. George A. Swem will continue as industrial sales engineer. J. H. Mosher is the Pacific Coast regional manager.

ARTIST'S CONCEPTION of $12,000,000 plant of Hooker Electrochemical Co. now under construction at Montague, Mich.; the 500-acre site has 200 acres set aside as a salt brine field; brine will be converted into caustic soda, chlorine, and hydrogen

Allied Personalities

ALEXANDER JENKINS JR. has been appointed eastern sales manager of Bird Machine Co., South Walpole, Mass. Mr. Jenkins, who has been with the firm six years, was at one time purchasing agent for Hollingsworth & Whitney Co.

A. Jenkins Jr.

H. E. Trotter

HERMAN E. TROTTER has been appointed Buffalo, N.Y., representative of B-I-F Industries. He will handle sales of Builders-Providence Inc. flow meters and controllers and Omega Machine Co. chemical feeders. He was formerly in sales engineering training in the Providence office of B-I-F.

DAN STEARNS, long active in Chicago in the materials handling equipment sales field, has been named by Clark Equipment Co. of Battle Creek,

THREE NEW APPOINTMENTS of Lamson Corp. of Syracuse, N.Y.: Calvin A. Burton, formerly conveyor sales manager, newly appointed assistant to the president; Edward H. Woodberry, new conveyor sales manager, and Gail D. Beaver, newly named product sales manager

Dan Stearns

Glen R. Johnson

J. V. Eakin

T. E. Metz

Mich., to be manager of the newly created Midwestern Division, with headquarters in Chicago. He is to be assisted by *GLEN R. JOHNSON*, who for the past six years has been one of Clark's national account representatives.

CLEMENT F. LOVELY has been made assistant manager of the Adhesives Sales Service of Philadelphia Quartz Co. A specialist in servicing the fiber container industry in the Midwest, he will continue to headquarter in St. Louis. Mr. Lovely is a member of Tappi.

JOHN V. EAKIN has been made general manager of the Fawick Airflex Division of Federal Fawick Corp. *THEODORE E. METZ* has been named advertising manager. Mr. Eakin has been with the firm since 1943 and was formerly assistant general manager, sales manager, and southwestern district manager. The division manufactures industrial clutches, brakes, and related products.

R. WOLCOTT HOOKER, formerly vice president in charge of sales, has been elected vice president of Hooker Electrochemical Co. At the same time he was given broader responsibility within the firm. *ROBERT E. WILKIN*, formerly general sales manager, was named vice president and general sales manager, while *FRANK W. DENNIS*, formerly director of industrial relations, was elected vice president in charge of industrial relations.

ALBERT H. O'NEIL has been elected assistant vice president of Freeport Sulphur Co.

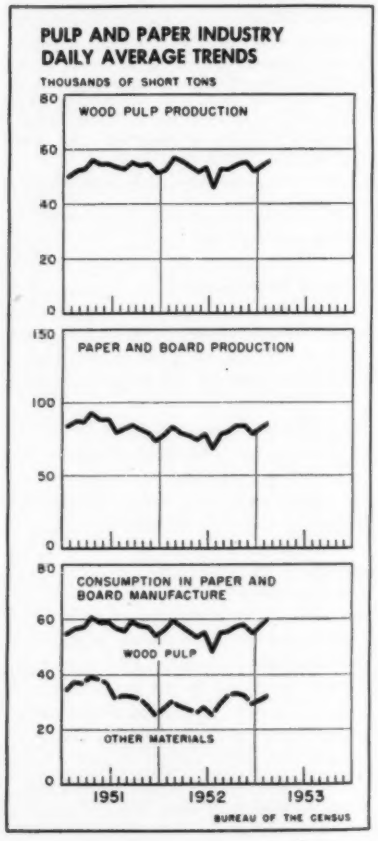
U. S. Paper and Paperboard Production

	Feb. 1953 (tons)	Jan. 1953 (tons)	Feb. 1952 (tons)	Total 1952* (1,000 tons)	Total 1947
Paper and Board, total	2,065,775	2,204,640	2,004,549	24,413	21,102
Paper, total	891.236	965,806	954,047	10,896	10,693
Newsprint	80,989	90,947	88,792	1,106	833
Groundwood paper (uncoated)	61,774	68,375	71,529	809	821
Printing and converting (coated)	92,368	100,170	91,353	1,096	
Book paper (uncoated)	128,198	137,328	128,037	1,482	2,208
Fine paper (writing, cover and text, bristols, thin paper and other)	100.332	104,212	122,081	1,295	1,172
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment, and other)	266,517	289,853	292,941	3,235	2,903
Special industrial paper	32,523	36,904	36,570	396	289
Sanitary paper	98,561	106,338	96,438	1,148	894
Tissue paper	18,916	19,899	16,656	209	195
Absorbent paper	11,058	11,780	9,650	118	100
Paperboard, total	955,110	1,018,316	848,192	10,776	9,187
Containerboard, total	505,571	558.593	448,904	5,770	4,943
Liners	336,871	376,349	303,439	3,905	3,293
Corrugating material	142,324	152,833	121,509	1,583	1,370
Container chipboard	26.376	29,411	23,956	282	280
Bending board (folding boxboard)	284,913	282,891	247,536	2,194	2,249
Non-bending board (set-up boxboard)	69,708	72,729	61,069	687	595
Cardboard	12,845	12,136	5,877	69	92
Special paperboard stock	82,073	91,967	84,806	2,056	1,307
Wet machine board	12,609	13,712	10,973	137	150
Construction paper and board, total	206,820	206,806	191.337	2,603	2,349
Construction paper	94,869	87,602	93,843	1.298	1,277
Hardboard and insulating board	111,951	119,204	97,494	1,305	1,072

(*) Preliminary report. *Source: U.S. Department of Commerce.*

February Pulp, Paper and Board Production

Paper and board production during February amounted to 2,065,775 tons, according to a report released by the Bureau of the Census. This is an approximate 3 per cent increase over the 2,004,549 tons produced in February 1952. The output of paperboard grades during the month, amounting to 955,110 tons, reflected an increase of 11 per cent over 1952. Paper production, amounting to 891,236 tons, registered a decrease of 7 per cent from a year before.

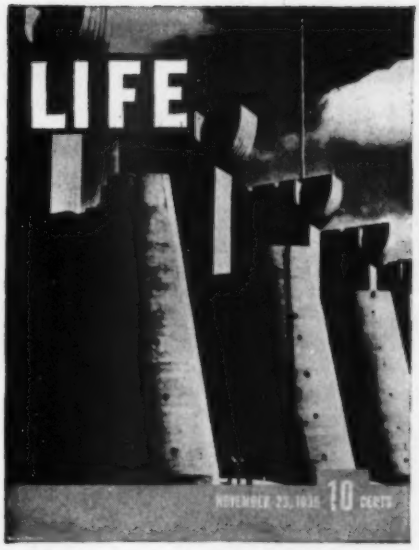


Pulpwood receipts at the pulp mills during February amounted to 2,296,969 cords, with consumption at 2,148,595 cords. Month-end inventories increased slightly to 6,145,485 cords.

Wood pulp production during February amounted to 1,344,944 tons, as compared to 1,368,737 tons produced in February 1952.

Wood pulp inventories at the end of February at paper and board mills were 553,800 tons, as compared to the 544,259 tons reported at the end of January. Month-end stocks at the pulp mills amounted to 147,778 tons, reflecting a decrease of 4 per cent.

The spark of LIFE



On November 23, 1936 a new concept of the ancient art of recording events in picture-story form set the publishing field on fire with the first issue of LIFE magazine.

From zero circulation 17 years ago to five and one-half million today, LIFE continues to grow in readership and importance.

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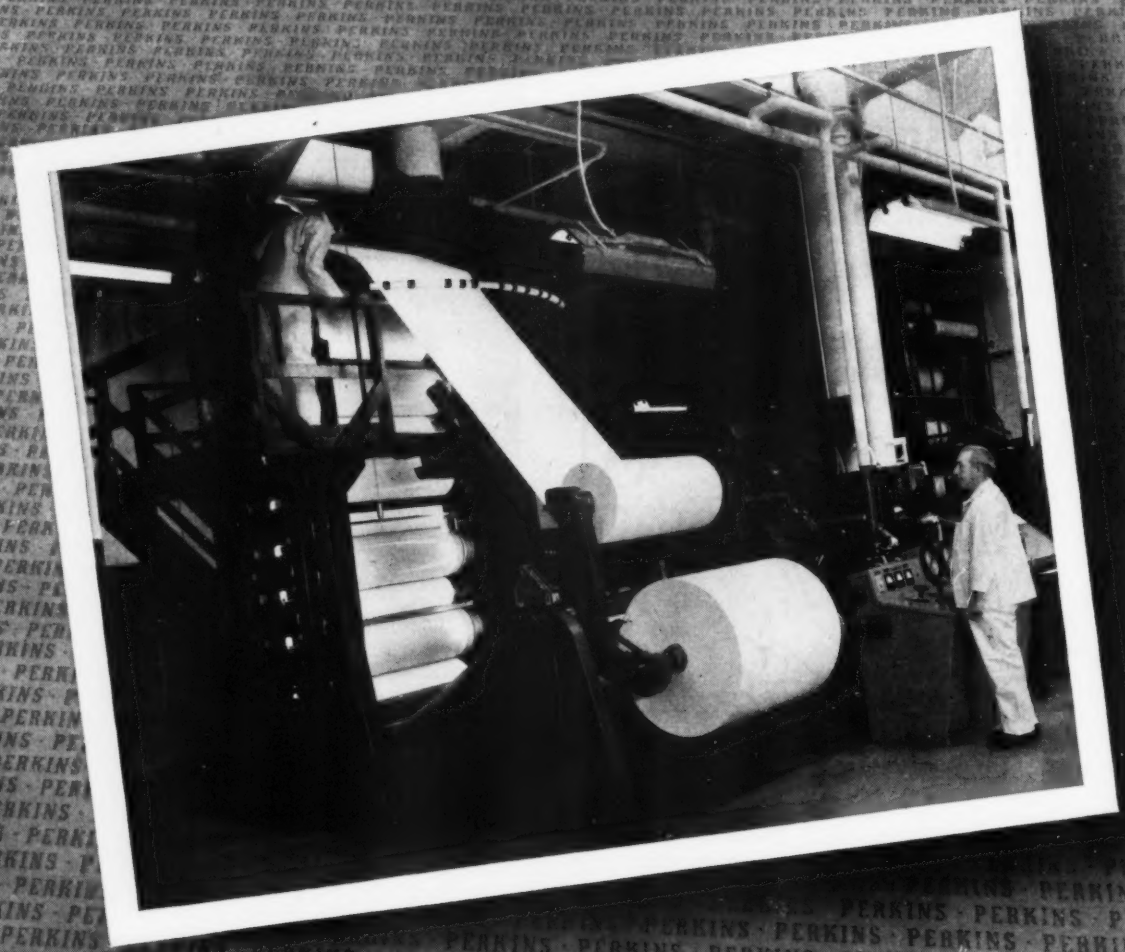

Photograph Paper Must Have Perfect Finish

— And here is a Perkins 50" Nine-Roll Web Supercalender, made for Eastman Kodak Company finishing world famous photographic printing papers at high speed . . . Operating nip pressure 2,000 pounds per lineal inch at the bottom nip . . . five (5) Farreloy chilled iron rolls, ground to a .5 micro-inch finish . . . four (4) Perkins cotton rolls . . . Timken roller bearings . . . gravity feed lubrication . . . hydraulic pressure . . . equipped with revolving reel for wind and unwind . . . Perkins semi-steel cast frame for rigidity . . . no vibration. Designed and built for tomorrow's high speeds and pressures.

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LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

The Paper Industry Association News

Chip Conditioner Method to be Unveiled at CPPA Technical Section Meeting

The 1953 summer meeting of the CPPA Technical Section will be held at the Saranac Inn in Saranac Lake, N.Y., June 4-6. A special feature of the gathering is to be a full-day session devoted to the first public disclosure of the Va-Purge impregnation pre-treatment, developed and patented by the Pulp and Paper Research Institute of Canada.

Va-Purge is a technique for conditioning chips or other materials prior to cooking and is applicable to any type of chemical pulping process, conventional or high-yield. It has been applied to semichemical pulping processes and to the cooking of various species of wood and other materials, including straw. It is believed to be applicable to continuous pulping and is said to make practical for the first time cooking in the vapor-phase (without excess liquor).

Dr. Otto Maass, general director of the Research Institute, will review the work done on the mechanism of liquor penetration into wood. A paper will also be presented outlining the theory behind the Va-Purge, followed by short talks on the method by representatives of mills that have used the technique. A panel will discuss the results obtained.

Other topics tentatively scheduled for discussion include: performance testing of paper machine dryer sections, newsprint moisture control in the dryer section, maintenance control, uses of a crack detector to indicate flaws in metals, applications of gas turbines in the paper industry, stock cleaning as applied to the board mill, factors affecting machine wire life with special reference to plastic edges, factors affecting felt life, corrosion in alkaline pulp mills, brown stock washing in alkaline pulp mills, sodium peroxide bleaching in kraft mills, and problems in the grinding of balsam, jack pine and poplar.

Metropolitan District of Empire State Tappi Elects

Ralph W. Kulmer of American Cyanamid Co. has been elected 1953-54 chairman of the Metropolitan District of Empire State Tappi. The election was held April 14 at a regular meeting of the group at Fraunces Tavern, New York, N.Y.

Other new officers include: John C. Rice of Lowe Paper Co., chairman-elect; John H. Doherty of Union Bag & Paper Corp., secretary-treasurer; and the following members at large of the advisory committee, A. V. Arenander Jr. of West Virginia Pulp & Paper Co., Walter T. Cusack of Aldine Paper Co., and L. E. Georgevits of Titanium Pigments Corp.

Record Attendance Expected at Atlanta for Supts.' Convention

Record attendance is anticipated for the forthcoming 34th annual meeting of the American Pulp & Paper Mill Superintendents Association. The gathering is to be held June 9-11 at the Atlanta-Biltmore Hotel in Atlanta, Ga.

Harry Weston, secretary-treasurer of the Association, has released a tentative program for the convention. Principal speaker at the opening session scheduled for 9:30 a.m. Tuesday will be Reuben B. Robertson Sr., board chairman of Champion Paper & Fibre Co. He will speak on the topic, "What's Ahead for the Paper Industry." In charge of the session will be Gordon K. Singletary of Brunswick Pulp & Paper Co., national president.

L. M. Wilson of Georgia Power Co., Atlanta, will address the Industrial Affiliates Recognition Dinner Tuesday evening. His subject will be, "South—Land of Opportunity." Mr. Singletary will preside. Chairman of the annual "Wake 'Em Up Breakfast," which is to be staged Wednesday morning, will be Vinson K. Shannon of the Mead Corp.

At the general conference on Tuesday the highlight will be a forum on industrial relations, with Lee M. Bauer of Ecusta Paper Corp. as chairman; Walter B. Morehouse of Nopco Chemical Co. will be co-chairman. Participants will include D. M. Rochester of the American Paper and Pulp Association; A. J. Miller Jr. of the Mead Corp.; Harry F. Dunning of Scott Paper Co., and Robert D. Gidel of the National Safety Council.

Technical sessions

Technical sessions will cover six phases of pulp and paper manufacture:

Paperboard: Chairman, L. B. Chamberlain of Container Corp. of America; co-chairman, Frank Sanger, The Pusey & Jones Corp. Participants in the general panel discussion will include Charles A. Shoudy and John A. Hoover, West Virginia Pulp & Paper Co.; George Ehman, The Ohio Boxboard Co.; Howard Breyfogle, Alton Box Board Co., and Harry E. Hadley, Gardner Board & Carton Co.

Engineering and Maintenance: Chairman, John A. McPherson, Mosinee Paper Mills Co.; co-chairman, J. M. Wilcox, Electric Steel Foundry Co. Among the participants will be Malcolm Pineo, Brunswick Pulp & Paper; G. L. Oscarson, Electric Machinery Mfg. Co.; W. C. Atkin, Dowell Inc., and A. O. Mortenson, St. Regis Paper Co.

Kraft Pulp and Paper: Chairman, Tom S. Coldeway, St. Joe Paper Co.; the co-chairman has not been named. Participants will be James E. Hall, Champion Paper & Fibre Co.; Dr. Wilson F. Brown, University of Florida, and Karl Guest, National Container Corp.

Sulfite Pulp and Paper: Chairman, Walter A. Sherman, Flambeau Paper Division of Kansas City Star Co.; co-chairman, A. A. Nyitray, Eastwood-Nealley Corp. Among participants will be John Hanson, Badger Paper Mills; Arthur L. Landesman, Fischer & Porter Co.; Gordon J. Chalmers, Ross Engineering of Canada Ltd., and C. C. Parvin, Nekoosa-Edwards Paper Co.

High-yield Pulping: Chairman, L. W. Murtfeldt, Consolidated Water Power & Paper Co.; the co-chairman has not been named. Those participating in a seminar on problems of semichemical mills have not been designated.

Converting: Chairman, not designated; co-chairman, A. William Riedel, Gus Riedel & Son Co. Speakers will include Mr. Riedel; James Lyon, Atlas Boxmakers Inc., and Edward M. Root, The Black-Clawson Co.

Dirt Removal to be Highlighted at West Coast Meeting

A technical program including papers on dirt identification, dirt removal by hydraulic centrifugal cleaners and various type screens has been announced for the annual joint meeting of the Pacific Section of Tappi and the Pacific Coast Division of the Superintendents Association. The gathering is to be at the Gearhart Hotel in Gearhart, Ore., May 21-23.

Also included on the agenda will be

discussions on paper machine maintenance, and kraft and sulfite pulping. A feature will be the election of officers of the Tappi group.

Joint sessions will be held Friday morning and afternoon and Saturday morning. The business meetings are scheduled for Friday morning, while the technical sessions are to be that afternoon. Golf tournaments are planned for both the men and women attending.

Laminating Discussed by Egan at Chicago Tappi

While laminating on first thought may appear to be a simple operation, there is a great deal involved to achieve an acceptable product. This view was voiced by Frank W. Egan as he addressed the March meeting of the Chicago Section of Tappi. Mr. Egan is president of Frank W. Egan & Co., Bound Brook, N. J., and is chairman of the mechanical equipment subcommittee of the Coating Committee of Tappi.

The speaker listed the three major factors of laminating as follows: (1) web tension; (2) moisture retention, and (3) bonding. Mr. Egan discussed each in detail.

He emphasized the fact that friction breaks on the unroll shaft are not adequate, since they do not compensate for differences in the caliper of the sheet from one side to the other. Nor is it possible to compensate for the variation in draw due to change in roll size. Mr. Egan suggested that the proper method is to drive the unroll shaft with a motor that acts as a drag generator and to control the speed of the motor through a float roll. He also said that it is good practice to use a roll guide for directing the web to the adhesive applicator.

Moisture retention

With respect to moisture retention, the speaker declared that the best practice is to use a high-solids adhesive. The best method is to apply the adhesive to both webs and then bond them together. However, satisfactory results can be obtained by the application of adhesive to one web only.

An improved method, Mr. Egan said, for the use of high-solids adhesives is through the use of two chilled and bored iron rolls arranged horizontally in the adhesive pan, both rolls rotating in the same direction as the travel of the web. One roll acts as the applying roll, the other as a metering roll. The metering roll must be provided with a cleaning doctor and should be rotated slightly faster than the applying roll.

Bonding

The nature of the web determines the method of bonding, the speaker concluded. If the web is sufficiently open

THE PROBLEMS of laminating were the topic of Frank W. Egan as he addressed the March meeting of Chicago Tappi

so that adhesive passes through it readily, the laminating rolls must be operated in an open manner or in an "S" formation so as to prevent a strike-through of adhesive to the outer surface of the laminated web. The best method of laminating is to use two chilled iron rolls large enough in diameter to prevent deflection, utilizing the weight of the upper roll and using the pressure method to calender the two or more webs as they are laminated simultaneously. Each web should lay on the face of either the top or bottom laminating roll before it enters the nip. The speaker further explained that the top and bottom laminating rolls should be driven independently so as to prevent any curl in the laminated web. The caliper of the web or webs lying on the face of the laminating roll must be added to the radius of the roll to determine the proper speed of the web.

Men, Materials Limit Proper Design

Making better packages was the subject of Albert Kner of Container Corp. of America, Chicago, as he addressed a joint graphic arts meeting of the Kalamazoo Valley Section of Tappi and the Michigan Division of the Superintendents Association. The March 19 meeting was at the Hotel Harris, Kalamazoo.

The theme of Mr. Kner's remarks was that proper design can be achieved only after due allowance is made for the limitations of the material, men, and machines. He added that the best package made will not sell unless the salesman is sold first.

Up-to-date Forestry Practices Urged at CPPA Woodlands Meeting; 750 Attend

SOME 750 FORESTERS, woods managers, engineers and executives of the pulp and paper and associated industries in Canada and the United States attended the three-day annual meeting of CPPA's Woodlands Section in Montreal during March. Papers presented covered topics ranging from over-all forest management techniques to power saws and the feeding of woods workers.

Reelected chairman of the section during the 35th annual meeting was J. B. Matthews, chief forester for Abitibi Power & Paper Co. Ltd. A graduate of the University of Toronto, Mr. Matthews was at one time a regional forester with the Lands and Forests Department of Ontario. He later joined Provincial Paper Ltd. as chief forester.

Vice chairman for 1953-54 is J. H. Merrill, woods manager for Anglo-Canadian Pulp & Paper Mills Ltd. W. A. E. Pepler is manager of the Woodlands Section.

In his annual report, Chairman Matthews pointed to the great strides that have been taken in recent years in forest management. He described the "considerable progress" that has been made in the development of mechanical equipment specially designed for pulpwood logging. He also mentioned the work of the section's private land forest committee, which has been instrumental in stimulating the formation of a national tree farm movement in Canada.

The chairman reported that the section now has a membership of more than 1,000 foresters, engineers, woodlands executives, forestry students, firms serving the forest industries, etc. Among the subjects investigated by its various committees and special groups during the past year, he said, were aerial surveys, nutrition, camp heating, rail transportation of pulpwood, cutting tools, labor training and turnover, fire prevention, the mechanical hauling of pulpwood, and silviculture. Several matters were studied in collaboration with the Pulp and Paper Research Institute of Canada. These included pulpwood holding grounds, the chemical treatment of trees to facilitate debarking, silvicultural research into the regeneration of pulpwood after logging, and the control of biting insects.

Technical papers

Industry Experimental Forests—E. L. Howie, chief forest engineer for Fraser Companies Ltd., declared at one of the

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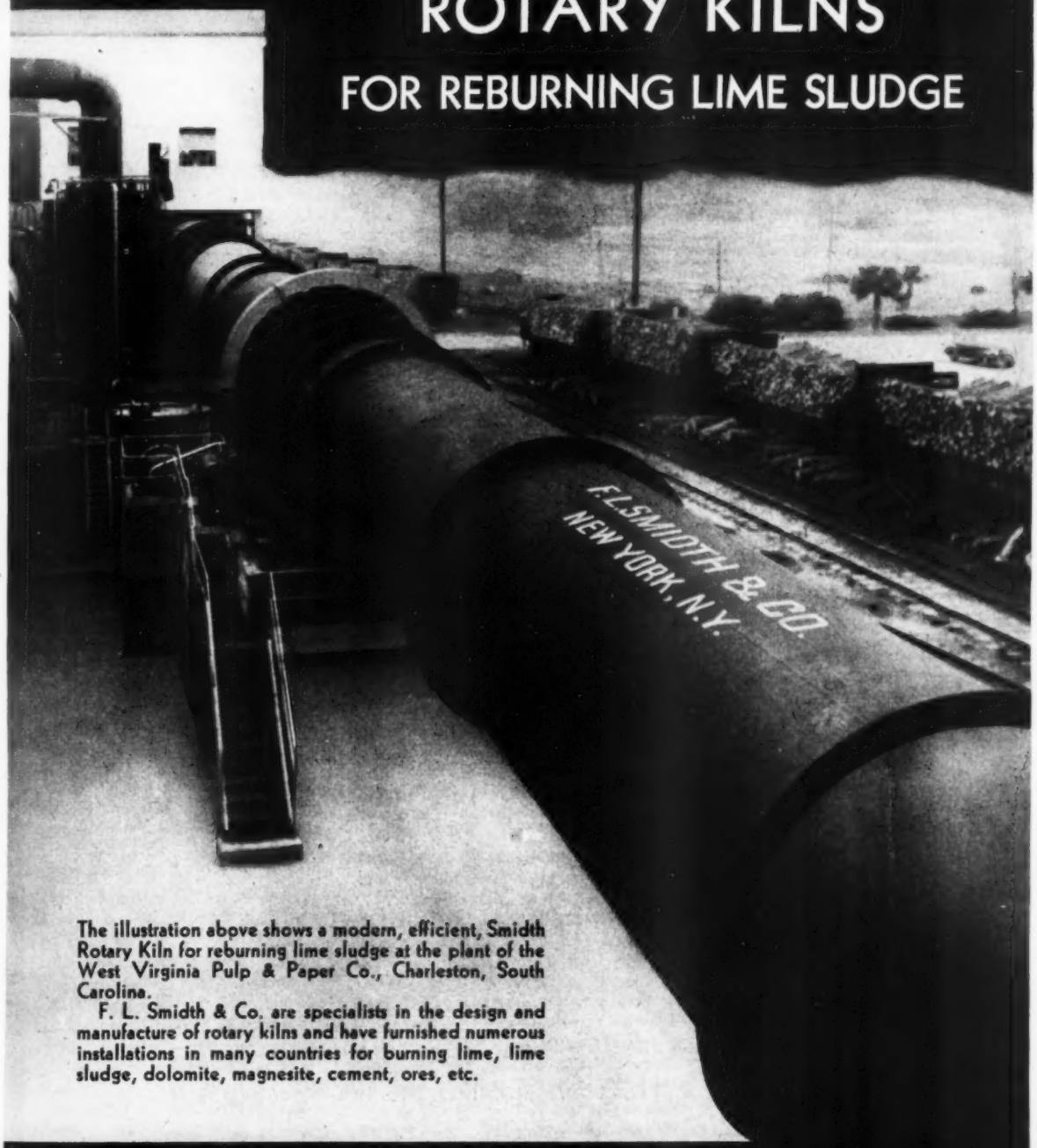

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The dates for the meeting are June 9-11, 1953.

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numerous technical sessions that, "Reduced operating costs must be effected through increased operating efficiency, which is directly dependent on new or improved logging techniques. These, in turn, are dependent on research and study."

The speaker urged greater effort in the field of research and suggested that ways and means of stimulating imaginative thinking are needed. . . . Industry fundamental research activities must be largely vested in the Woodlands Section, the Pulp and Paper Research Institute of Canada, and the federal government. Applied research should be undertaken by the companies.

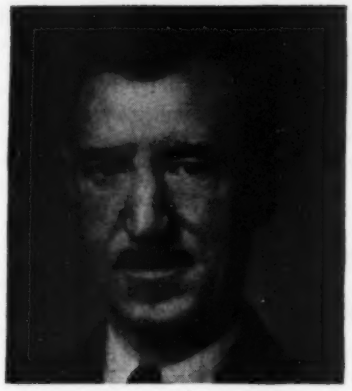
Silvicultural Experiments — Research in an experimental forest can yield specific answers only because the area is confined, but techniques involved and learned can be applied to other areas in the same region, said H. O. Kantola, divisional superintendent for Newago Timber Co. Ltd., Port Arthur, Ont. If such an experimental forest is established by a company, it is necessary to determine what course of silviculture is best suited to the area, he declared. To set a proper silvicultural policy for work in the forest, a firm should evaluate the potential to grow wood. It should also decide on the type of trees it wants. The value of its end product will determine how intensive the silvicultural practice should be.

Sustained Yield Economics—Dr. Edward Pogacnik of Montreal, formerly of Yugoslavia, described the sustained yield management of the 1,000-acre Lehen Forest in his native land. With a climate similar to that of central Canada, Dr. Pogacnik declared, Forest Lehen is one of the main experimental forest units in Yugoslavia. Systematic management was started in 1909

Pointing to the success of scientific methods is the fact that in 1909 the yield was 26 cords per acre; in 1948 the yield was 40 cords. Undesirable trees were removed, and general gardening techniques were employed.

Direct Seeding—It will be a great thing for the forests of Ontario if direct seeding can be made a successful and economic means of forest reforestation, said A. P. Leslie of the Southern Research Station, Ontario Department of Lands and Forests. Up to the present, the results of direct seeding have been too uncertain, and most forest managers have supplemented natural regeneration by planting. There are, however, sufficient indications of success to justify a thorough test of the method. In a few years more complete data should be available to prove that direct seeding is a useful silvicultural method.

Direct seeding may be done on the ground or from the air. For either method, the ground must have sufficient moisture, be of suitable texture and porosity and preferably cultivated. The sown seed too must be protected from rodents, insects, fungi, winds and excessive temperatures.



W. A. E. Pepler
Manager, Woodlands Section

J. B. Matthews
1953-54 Chairman

Site Classification—To manage a forest properly, the forester needs to know the species of trees that can be grown in the area, the volume of growth that will determine the amount that can be cut on a sustained yield basis, and the potential of the site for growing the types of trees desired. A method of classifying a forest site was presented by W. G. E. Brown of the Forestry Branch, Department of Resources and Development, Ottawa. Physiography, which includes the local climate, soil moisture and the permeability and mineralogical nature of the soil, is, according to Mr. Brown, the basis for this method of site classification. The area is divided into landforms of hills and valleys. From the work carried out to date, it is possible to identify the sites from air photographs through the identification of landform positions.

Bonnard Prehauler—A vehicle specially designed under the auspices of the Woodlands Section to pick up more than a cord of pulpwood from where it has been cut and transport it over a strip road to the main haul road was described by B. J. McColl, the section's mechanical engineer. Three units were built in the shop of Bonnard Equipment Ltd. at Lachine, Que., before the present prehauler was produced. Characteristics required of the equipment included sufficient flotation, traction, underbody clearance, and maneuverability. Furthermore, the loading and unloading systems must be able to pick up and discharge an adequate bundle of wood under varying circumstances. Preliminary experience with the vehicle shows that it has remarkable performance in handling bundles of 4-foot pulpwood.

Panel discussions

At one of several panel discussions staged during the three-day meeting J. F. Walker, resident manager of The Ontario Paper Co. Ltd., declared that it would seem preferable to conduct research into logging and silviculture practices on experimental forest areas set apart from actual logging operations. Mr. Walker, who served as moderator on a panel on industry experimental forests, said that such experimentation can be wasteful in groping for answers to problems. Furthermore, the continuity of such work would likely be more assured if an area is specially set aside for the purpose and staff and equipment assigned to it. Research or experimentation can and does proceed in operating areas, he said. However, it is usually of a specific interest only for the duration of that operation, and the necessary personnel might not always be available for observation and administration.

A. M. Martin, woods manager for Bowater's Newfoundland Pulp & Paper Mills Ltd., served as moderator for the panel on moving pulpwood from the stump to the first landing. Moving pulpwood in bolts or in larger logs or in tree lengths from where it is cut to the main haul road or driveable creek, he declared, represents the highest unit-distance transportation cost in a pulpwood production operation. It also presents the largest number of methods and labor and supervision problems.

The panel on power saw training was supervised by R. T. Carter of the Department of Industrial Relations of Abitibi Power & Paper Co. Ltd. He pointed out that the mechanical felling and bucking of pulpwood has been the last segment of the pulp and paper industry to share in the mechanical progress made in other fields of the industry. He said, however, that progress in power saw development has gone steadily forward. The first chain saw was patented in 1858; but prior to 1950 there was no

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power medium light enough to be used for the portable saw. Today the number of power saws on company logging operations in eastern Canada can be counted in the thousands. Indeed, 20 per cent of the total crop of 4-foot pulpwood cut by five companies over a 10-month period last year was produced by power saws.

War on the budworm

Spraying operations aimed at destroying the budworm hordes that have invaded eastern Canada in recent years were discussed by B. W. Flieger, manager of Forest Protection Ltd. He said that the 1953 project is tentatively scheduled for the end of May or the first of June. Some 1,000,000 acres in northern New Brunswick are the target.

Forest Protection Ltd. is a cooperative non-profit organization formed by the New Brunswick government and four pulp and paper firms: Bathurst Power & Paper Co. Ltd., Fraser Companies Ltd., New Brunswick International Paper Co., and Irving Pulp & Paper Co. The 1953 operation is a follow-up on the 1952 spraying of 200,000 acres. Following his talk, Mr. Flieger showed the color film, "Operation Budworm," which depicted some of the preparations being made for this year's project, including the construction of five air fields. The speaker declared that the spraying is to be continued in 1954.

Other addresses presented at the meeting of the section included "Report on Feeding in Logging Camps—1952," Dr. D. L. Gibson, head of the Department of Dairy Science at the University of Saskatchewan, and "Forests in Relation to Rainfall," Dr. Wallace E. Howell, president of W. E. Howell Associates Inc.

Annual awards

In recognition of meritorious work in woodlands research and operations, the Woodlands Section granted the following awards, each consisting of a bronze plaque and $100:

J. A. Bothwell Award—Presented to B. W. Flieger of Canadian International Paper Co. in recognition of his organization of the budworm spraying operations in New Brunswick during 1952. The award was made by P. M. Fox, president of St. Lawrence Corp. Ltd., which donates the plaque in memory of J. A. Bothwell, former president of Brompton Pulp & Paper Co. and of the CPPA.

Ellwood Wilson Award—Presented to L. G. Kerr, engineer for Quebec North Shore Paper Co., for his work on power saw training aids. The award was made by E. M. Little, president of Anglo-Canadian Pulp & Paper Mills Ltd., the firm donating the plaque. The citation is made each year for the most effective industrial application of research projects instigated and carried out either by the Woodlands Section, in cooperation with the Pulp and Paper Research Institute of Canada, or by a member company.

Price Bros. & Co. Ltd. Award—Presented to Francois Matte, forester for Donnacona Paper Co., for his paper on silvicultural requirements and cutting methods utilized on Donnacona's Jacques Cartier forest limits. Given to the member presenting the best paper on a subject other than mechanization, the award was made by A. C. Price, president of Price Brothers.

Consolidated Paper Corp. Ltd. Award—Presented to E. R. Mooney of Canadian International Paper Co. for his paper on the hauling of pulpwood from the James Bay watershed to the St. Maurice River valley. Given for the best paper on mechanical hauling—based on actual experience, the award was made by G. M. Hobart, president of Consolidated.

Gerard Lavoie, national bucksaw champion representing Quebec North Shore Paper Co., won the annual bucksaw contest, with an average time of 6.6 seconds. His best time recorded during the six cuts was 6.1 seconds.

1953-54 officers

Newly elected officers of the section in addition to Mr. Matthews and Mr. Merrill are as follows: Councillors—R. S. Armitage, Price Bros. & Co. Ltd.; R. R. Douglas, Alaska Pine & Cellulose Ltd.; F. L. Flatt, Spruce Falls Power & Paper Co. Ltd.; F. A. Harrison, Canadian International Paper Co.; P. V. LeMay, Marathon Paper Mills of Canada Ltd.; R. G. MacFarlane, Fraser Companies Ltd.; W. F. McColm, Donnacona Paper Co. Ltd.; G. A. Potts, The Ontario & Minnesota Pulp & Paper Co. Ltd.; H. A. Sewell, The Ontario Paper Co. Ltd., and L. L. Wetmore, St. Lawrence Corp. Ltd. Ex-officio councillors are C. R. Mills of Ontario Forest Industries Association and Edgar Porter of Quebec Forest Industries Association.

APPA Community Relations Meeting at Syracuse

Paper mill men will discuss "Economic Education" at an APPA meeting in the Hotel Syracuse, Syracuse, N.Y., May 21. The announcement was made by D. M. Rochester, secretary of the APPA Community Relations Committee. Participating in a panel discussion will be Frank Thompson, Champion Paper & Fibre Co., Hamilton, Ohio; James P. Nolan, Oxford Paper Co., Rumford, Maine, and Joseph J. Coote, the American Economic Foundation, New York, N.Y. David C. Knowlton, president of Knowlton Bros. of Watertown, N.Y., will be moderator.

The Southeastern Division of the Superintendents Association has appointed George Hardaker of Asheville, N.C., as industrial affiliate representative. Mr. Hardaker is a representative of Lockport Felt Co., Newfane, N.Y. The appointment was announced by V. K. Shannon of the Mead Corp., Sylva, N.C., division chairman.

Coming Events

TAPPI meetings

May 21-22—Lake Erie Section, Measurement and Control Conference, Hotel Carter, Cleveland.

May 21-23—Pacific Section, joint meeting with the Pacific Coast Division of the Superintendents Association, Gearhart Hotel, Gearhart, Ore.

May 25-27—Fourth Coating Conference, Netherlands Plaza Hotel, Cincinnati.

June 8-10—Empire State Section, annual meeting, White Face Inn, Lake Placid, N.Y.

June 19-20—New England and Maine-New Hampshire Sections, joint meeting, Poland Spring House, Poland Spring, Maine.

American Pulp & Paper Mills Superintendents Association meetings

May 21—Michigan Division, Hotel Harris, Kalamazoo.

May 21-23—Pacific Coast Division, joint meeting with the Pacific Section of Tappi, Gearhart Hotel, Gearhart, Ore.

June 5—Miami Valley Division, Orr Felt & Blanket Co., Piqua, Ohio.

June 9-11—National meeting, Atlanta-Biltmore Hotel, Atlanta.

Other meetings

May 18-20—National Paperboard Association, spring meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Cal.

May 18-22—Materials Handling Conference and Fifth National Materials Handling Exposition, Convention Hall, Philadelphia.

May 21—APPA Community Relations Committee, panel on Economic Education, Hotel Syracuse, Syracuse.

June 2—Technical Conference of the APPA Committee on Coordination of Research, sponsored jointly with the U. S. Forest Products Laboratory, Madison, Wis.

June 4-6—CPPA Technical Section, summer meeting, Saranac Inn, Saranac Lake, N.Y.

June 4-6—Chemical Institute of Canada, 36th annual conference, Windsor, Ont.

June 10—American Material Handling Society, first in a series of Traveling Clinics, Hotel Statler, New York, N.Y.

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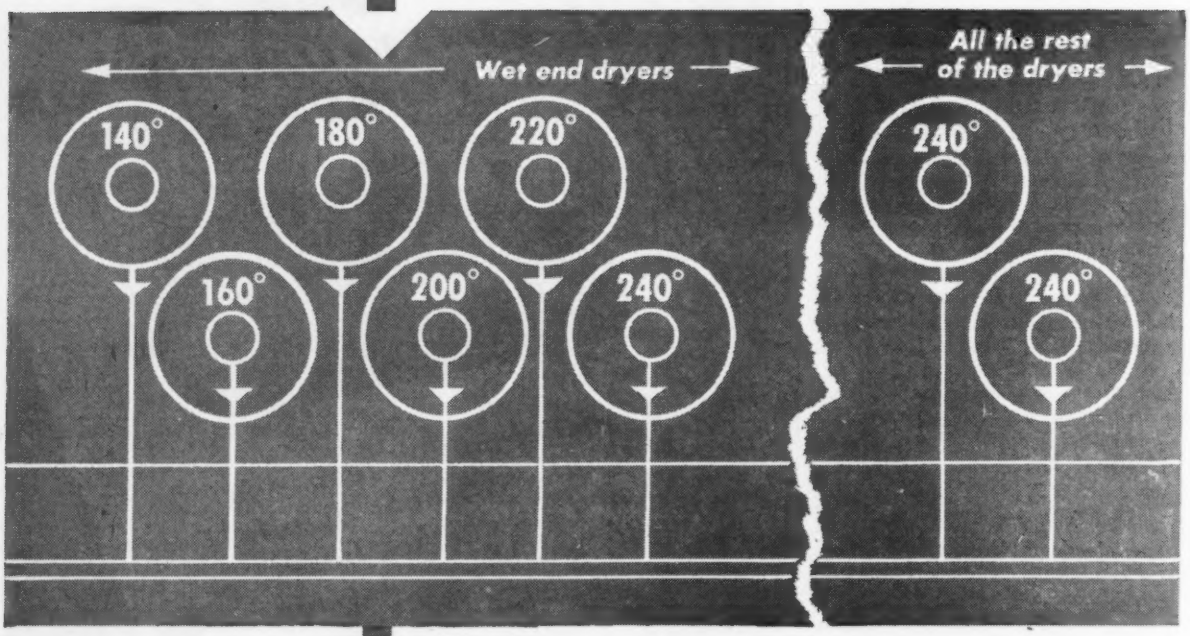

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The Paper Industry Names in the News

C-Z Executive Changes; Two Vice Presidents Appointed

Directors of Crown Zellerbach Corp. have announced that *FRANK N. YOUNGMAN* of Portland, a director and vice president, has been assigned additional responsibilities as general representative of the firm in the Pacific Northwest.

With a background of pulp and paper experience with Consolidated Water Power & Paper Co., Mr. Youngman joined Pacific Mills Ltd. as vice president and director in 1927. He came to Portland in 1932 to assume charge of C-Z sales in the Northwest. In 1938 he was named vice president and in 1947 was elected a director.

Sinclair and Stamm named

P. T. SINCLAIR has been promoted to the position of vice president. He relinquishes duties as assistant vice president for the manufacturing department and takes active charge of the industrial relations department, succeeding Alexander R. Heron. Mr. Sinclair will continue his functions as chairman of the executive development committee.

P. T. Sinclair

E. P. Stamm

He joined C-Z in 1928 in the electrical department of the Port Townsend kraft mill—then under construction. After service as a steam plant statistician, Mr. Sinclair was assigned to the steam plant of the new Olympic Forest Products mill at Port Angeles (now Rayonier) and in 1931 was sent to the Carthage, N.Y., mill as plant engineer.

He was made resident manager at Carthage in 1938 and in 1944, when plans for making coated paper at West Linn, Ore., were activated, was promoted to assistant resident manager of that operation. Mr. Sinclair moved up to the position of resident manager in 1947. In 1950 he was made staff assistant of manufacturing, headquartering in San Francisco. Three months later he was promoted to the post of assistant manager of manufacturing for paper, and in 1952 he was made assistant vice president of the manufacturing department, with responsibility over paper production.

EDWARD P. STAMM, Crown Zellerbach logging manager since 1935, has been chosen vice president in charge of timber, logging, and forestry operations for the firm's U.S. possessions. He has been with the company 27 years. In 1926 he joined Crown Willamette Paper Co. on railroad engineering and construction, shortly thereafter being promoted to logging superintendent. In 1928 he was named general logging superintendent and divided his time between the Cathlamet, Bradley, and Youngs River operations. In 1935 he was promoted to logging manager for C-Z and moved to the Portland headquarters.

When Mr. Stamm joined the timber department, company ownership was about 100,000 acres, with two forest engineers employed. Today, the ownerships in the U.S. exceed 500,000 acres, and 40 professional foresters are employed. He is chairman of the Industrial Forestry Association; a director of the Western Forestry Association; a director of the American Forestry Association, and an honorary director of the West Coast Lumbermen's Association. He was president of the Pacific Logging Congress in 1935 and continues as a member of its management committee.

J. FRED BERRY, formerly personnel manager, has been named general insurance manager for Alton Box Board Co., Alton, Ill. Mr. Berry is a member of the contest committee of the National Safety Council's Pulp and Paper Section.

Scott Announces West Coast Changes

Scott Paper Co. of Chester, Pa., has announced a series of moves affecting its West Coast operations.

L. S. BURDON, assistant vice president, will supervise the activities of the firm's Empire, Ore., and Anacortes, Wash., pulp mills, reporting directly to Paul C. Baldwin, chief administrator of Scott's West Coast operations.

R. I. THIEME, technical director of the Soundview Division plant at Everett, Wash., has been appointed plant manager at the Anacortes mill. He replaces *C. W. CARD*, who has transferred to the Industrial Distribution Division as a regional sales manager.

L. V. FORMAN, staff pulp utilization manager at Chester, has been named technical director of the company's West Coast pulp mills. He will headquarter in Everett.

Crystal Promotes Barnickle

ANDREW ("Andy") BARNICKLE, veteran machine tender at Crystal Tissue Co., Middletown, Ohio, has been promoted to tour foreman, according to a recent announcement by Howard H. Harrison, vice president in charge of manufacturing. Mr. Barnickle has been in the paper industry in Middletown for more than 30 years. His first job was with the old Wordlow & Thomas mill as fourth hand. And he was associated with Sorg Paper Co. for three years before joining Crystal as back tender in 1927, having been promoted to machine tender in 1936.

Andrew Barnickle

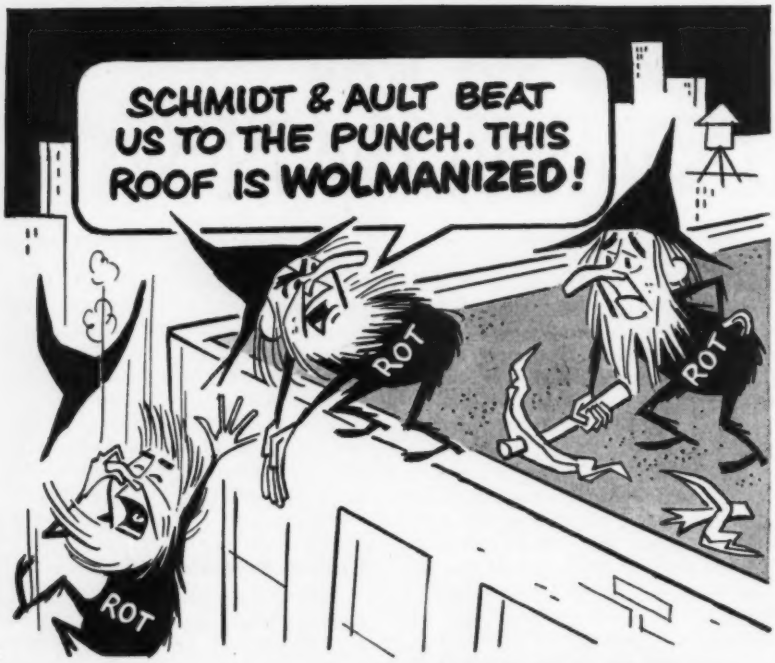
Allen Abrams

ALLEN ABRAMS, vice president in charge of research for Marathon Corp., has been elected president of the Industrial Research Institute Inc., New York, N.Y.

E. T. POWERS has been named director of the development department of Celanese Corp. of America.

Hammermill Changes

DR. DONALD T. JACKSON, former director of the Hammermill Laboratories, has been appointed director of research and development for Hammermill Paper Co. He will be responsible for developing new processes, new and



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improved products, and new sources of raw materials at the Erie, Pa., mill. Working with him in this assignment will be Dr. John C. Tongren as process development associate and Kurt C. Neuenfeldt as development engineer.

Succeeding Dr. Jackson at the Hammermill Laboratories is *DR. A. H. CROUP*, who has been head of the research section.

In another organization change, *WYNDHAM R. WHITELY* has been appointed Hammermill's maintenance superintendent, while *HARRISON P. BALDWIN* has been named planning engineer and *MERLIN J. SMITH* maintenance engineer. Mr. Whitely was formerly assistant to the superintendent of maintenance. He succeeds F. E. Divine as maintenance superintendent.

Clarence F. Kingston, paper mill superintendent at Erie, has announced seven promotions in conjunction with the reorganization of mill supervision. In the three top moves, *JOSEPH H. HANDLEY*, *CLAIR S. HAZEN*, and *JOSEPH E. VICKEY* were appointed to the newly created positions of general foremen; while *CARL J. RATAJCZAK* was appointed tour foreman-papermaking, and *JOHN A. SONNENBERG*, *RONALD R. BUCHMEYER*, and *JOHN F. MALLORY* were made relief tour foremen.

KENNETH D. LOZIER has been elected a vice president of St. Regis Paper Co. Mr. Lozier, who joined the firm 13 years ago, will be responsible for advertising and sales promotion. The board at its meeting also elected *B. W. RECKNAGEL* as an assistant secretary.

K. D. Lozier

A. M. McBurney

ANDREW M. McBURNEY has been elected vice president for sales of both Oxford Paper Co. and Oxford Miami Paper Co. He has been associated with Oxford since 1936 and until his recent appointment was general manager of sales for both firms.

FRANK KILHAM has succeeded *DONALD OSBORNE* as personnel and safety supervisor at the Crown Zellerbach Corp. mill at Port Townsend, Wash. Mr. Osborne has been transferred to West Linn, Ore., where he will serve as training supervisor at C-Z's operations

there. He had been supervisor at Port Townsend for 3½ years. In 1950 the mill was awarded first place in a national competition for having the lowest accident frequency record of 65 mills in its category.

C. G. McLAREN, vice president of National Container Corp., has been elected to the board of directors along with *WILLIAM F. YOUNG*, assistant vice president of New York Life Insurance Co. Their election increases the board from 12 to 14 members.

C. G. McLaren

A. T. Patton

ALLAN T. PATTON has been made director of pulp sales for Canadian Chemical & Cellulose Co. Ltd., Montreal. Since 1945 he had been associated with Mead Sales Co. in New York, N.Y.

Yarber Named Production Head of Two Holyoke Firms

Ralph H. Morrill, president and general manager of both Crocker-McElwain Co. and Chemical Paper Mfg. Co. of Holyoke, Mass., has announced the appointment of *CLIFFORD J. YARBER* as manager of production in charge of manufacturing.

A native of Indiana, Mr. Yarber joined Chemical Paper's staff in 1919 as a papermaker. He spent considerable time in each mill department, beater and machine rooms, as well as the testing and control laboratories. In 1931 he was named general superintendent. He is

Albemarle Announces Nine Promotions

Albemarle Paper Mfg. Co. of Richmond, Va., has recently announced nine promotional changes. According to F. D. Gottwald, president, they are as follows:

CHARLES H. ROBERTSON, from production manager of the Richmond plants to director of labor relations for all divisions; *F. D. GOTTWALD JR.*, from assistant production manager of the Richmond plants and acting superintendent of the Brown's Island plant to production manager.

JOHN S. HALSEY, from superintendent of the waterproof plant in Richmond to assistant production manager; *GORDON A. TRAINHAM* and *J. B.*

WHICH POWER TYPE IS BEST FOR YOU?

...electric, gas, diesel or L.P. gas?

No two jobs are exactly alike, so there's no such thing as one "best" power type. Which type is best *for you*?—that's the important question. The only person who can give a really *unbiased* answer is one who knows them all, and knows where they fit.

That's your local CLARK Dealer. He carries electric, gas, diesel and L. P. gas units—and he's got no ax to grind for any one. His object is to provide the one that's best for you. For example, careful application analysis often proves that *electric* trucks are best for certain jobs because of these advantages:

★ Economical operation on low-cost electric power

★ Long life, less maintenance—electrics have fewer, simpler moving parts

★ Smooth, vibration-free handling of fragile loads, less wear on truck

★ Quiet, clean operation

Which power type is right for you? No matter what it is, you'll find it in the CLARK line of quality handling equipment. You'll always be right when you buy from CLARK.

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1 Better battery efficiency—users report *more work* per amp-hour with CLARK.

2 Greater stability—safer for load, safer for operator.

3 Faster acceleration, greater speed—gets more work done, covers more ground.

4 Safer, smoother stops—with CLARK's positive-controlled, reverse torque braking.

5 "Application-engineered"—for special requirements, CLARK provides custom engineering.

CLARK ELECTRIC, GAS, DIESEL, L.P.GAS FORK TRUCKS AND POWERED HAND TRUCKS - INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 22, MICHIGAN

Please send: ☐ Condensed Catalog ☐ Driver Training Movie ☐ Have Representative Call

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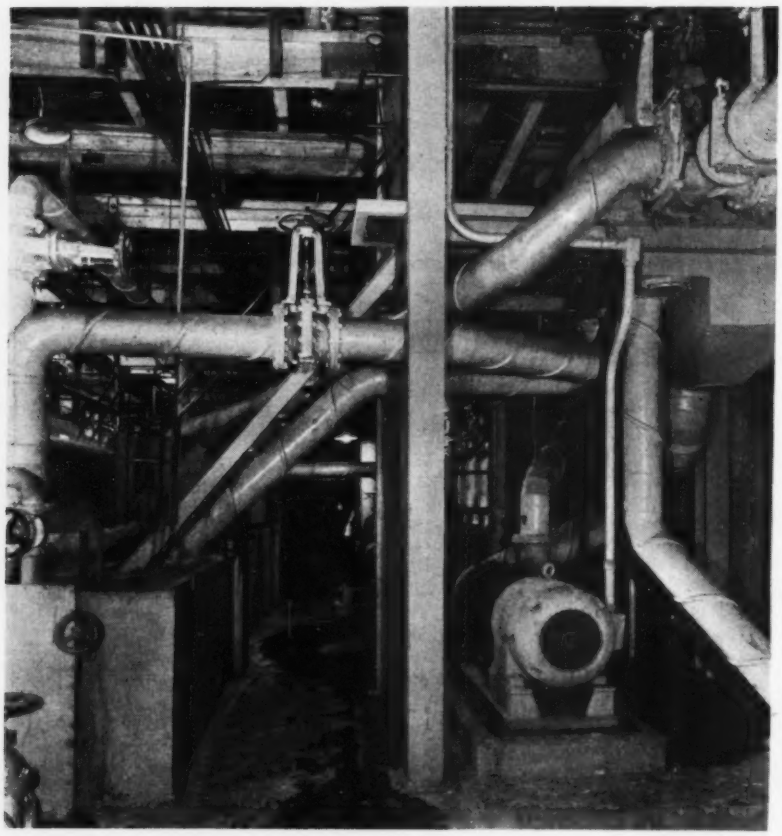
What's Your Line?

In Paper Mill Service...the Answer is NAYLOR



Whether your line is for stock and pulp, for water, for compressed air, for exhaust steam or for ventilating, Naylor lightweight pipe takes the guess-work out of your piping requirements.

This distinctive light-wall pipe is built with a lockseamed, spiralwelded structure that assures extra strength and safety. And Naylor is easy to handle and install. That's why it's the all-around pipe for paper mill service.

Write for Bulletin No. 507.

NAYLOR PIPE

Naylor Pipe Company
1236 E. 92nd St., Chicago 19, Ill.
New York Office: 350 Madison Ave., New York 17, N.Y.

COMBS, from assistant superintendents of the above plants to superintendents; *G. A. GARRISON* and *M. A. NUCKOLS*, from foremen to assistant superintendents; *S. T. McCLANAHAN*, from assistant maintenance superintendent at Brown's Island to plant engineer, and *W. T. JOHNSON*, from junior engineer to assistant maintenance superintendent at Brown's Island.

A. W. Greeley Named Alaska Regional Forester

ARTHUR W. GREELEY, assistant to the director of the Pacific Northwest Forest and Range Experiment Station at Portland, Ore., has been appointed regional forester for Alaska. The announcement was made by Richard E. McArdle, chief of the U.S. Forest Service.

Mr. Greeley will succeed *B. FRANK HEINTZLEMAN*, who was recently appointed governor of the territory. As regional forester, he will be responsible for the administration of 20,742,762 acres in the Chugach and Tongass national forests, which are particularly valuable for their pulpwood. It has been estimated that they could supply 1,000,000 tons yearly forever. One pulp mill of 350-ton daily capacity is already under construction.

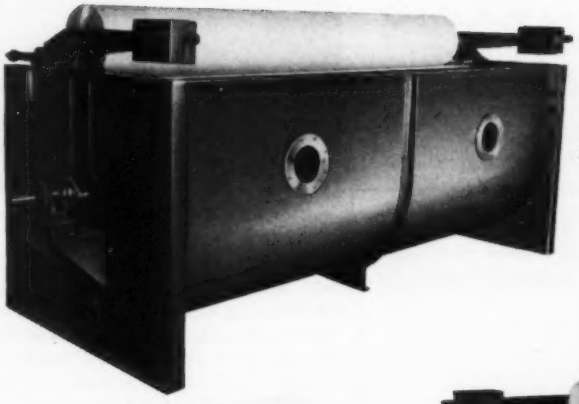
Two other changes in the Alaskan personnel were announced. *JOHN L. EMERSON*, assistant to the U.S.F.S. representative on the Columbia River Basin Commission in Portland, will supervise administrative management and engineering. *WILLIAM H. JOHNSON*, supervisor of the Snoqualmie National Forest in Washington, becomes assistant regional forester in charge of forest resources, replacing Charles G. Burdick, who retired March 31.

Mr. Greeley is the son of William B. Greeley, who was chief of the Forest Service from 1920 to 1928. He is a graduate of Yale University with a masters degree in forestry and began his career with the service in 1935 as a junior forester in Idaho. He was timber management assistant in the office of the chief forester in Washington, D.C., between 1944 and 1947.

R. L. CAIN, vice president, has been elected to the board of directors of Westfield River Paper Co., Russell, Mass., and its wholly owned subsidiary, The Glassine Paper Co. of West Conshohocken, Pa. *WILLIAM E. PORTER*, formerly of Firestone Tire & Rubber Co., has been elected treasurer of both companies, and *FRANK POTTER*, previously assistant to the president, has been appointed manager of Glassine.

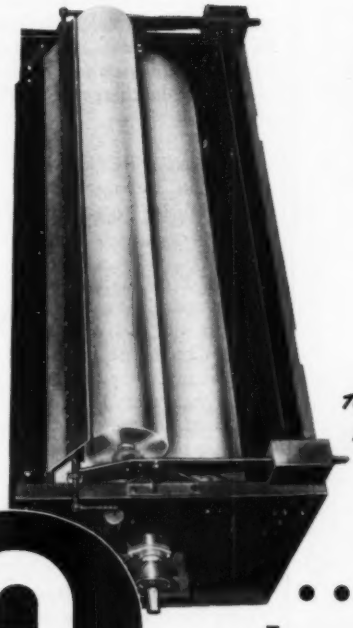
ROBERT FAEGRE, executive vice president of Minnesota & Ontario Paper Co., has been elected to the board of di-

ANY WAY YOU LOOK AT IT...



VIEW OF END AND INTAKE SIDE OF COWAN DECKER

VIEW OF EFFLUENT DISCHARGE END FROM INTAKE SIDE



TOP VIEW SHOWING RUBBER-COVERED COUCH ROLL AND 48"DIA.– 131" CYLINDER MOULD

...the Cowan Decker shows its superiority!

COWAN DECKER PRODUCTION FIGURES:

35 tons/day — Groundwood
85 tons/day — Sulphite
100 tons/day — Kraft

APPLETON MACHINE COMPANY
APPLETON WISCONSIN

Exclusive U.S. licensee for Cowan Deckers

rectors. His election enlarges the board to 11 members. Mr. Faegre was appointed to the vice presidency in February. He has been associated with Mando since 1938.

JOHN R. KIMBERLY, executive vice president of Kimberly-Clark Corp., has been elected a trustee of the Rockefeller Foundation.

DENNIS E. COUSINS and *FREDERICK GOODRIDGE*, vice presidents of Hollingsworth & Whitney Co., have recently been elected to membership on the executive committee.

E. R. LEONHARD has been elected president of Paterson Parchment Paper Co., Bristol, Pa. Following graduation from Dartmouth College in 1920, he was employed in the accounting department. In 1922 Mr. Leonhard was made traffic manager and in 1925 joined the sales department. In 1935 he was named assistant director of sales. And from 1938 until his recent election he served as vice president in charge of sales.

MYRON BLACK, mill manager and technical director of Inland Pulp & Paper Co. at Millwood, Wash., has been appointed to the newly formed Inland Empire Forest Research Advisory Committee with headquarters in Spokane.

JOE SMART has been promoted to the position of assistant superintendent of the Nekoosa paper mill of Nekoosa-Edwards Paper Co., Port Edwards, Wis. He had been assistant paper mill superintendent at Port Edwards. A graduate chemical engineer of the University of Wisconsin, Mr. Smart joined Nepco in 1939. At one time he was technical assistant to the paper mill superintendent at Port Edwards.

Joe Smart

C. B. Stauffacher

CHARLES B. STAUFFACHER has been appointed control officer for Continental Can Co. He was formerly executive assistant director for the U.S. Bureau of the Budget. Continental also announced the election of *BENJAMIN C. BETNER JR.* as vice president. He was formerly president of Benjamin C. Betner Co., whose assets and business were recently acquired by Continental. He will be in charge of the Betner Division.

J. R. NEWBERRY has been made production manager in charge of all manufacturing operations of Celotex Corp.

TOM ZILIOX has been named waste control coordinator for Champion Paper & Fibre Co., assisting Leo Geiser, the firm's director of production. Associated with Champion for 20 years, Mr. Ziliox has served in varied technical capacities in the Ohio Division. For the past several years he has been director of the waste control program at the Hamilton, Ohio, plant.

I. W. CARPENTER JR., former president, has been elected chairman of the board and chief executive officer of Carpenter Paper Co. At the same time, *KENNETH C. HOLLAND* was named president, chief administrative officer and general manager.

FREDERICK WIERK has joined National Container Corp. as engineering director. For the past two years he has been assistant manager of construction for the General Chemical Division of Allied Chemical & Dye Corp., New York, N.Y. Prior to that he was in business as an industrial consultant and at one time was a partner in the consulting firm of Johnson & Wierk Inc.

S. PAUL BOOCHEVER has been elected vice president in charge of the

"Honest, Mr. Superintendent, it took two men between 2 and 3 days to clean one suction press roll by the punch-out method. Now, using the Magnus Method, all our suction rolls are cleaned in only 4 hours running time!"

Name of mill on request.

Whatever your mill's cleaning problem, consult Magnus for its solution. No obligation, of course.

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Service Representatives in Principal Cities

Display Division of Gibraltar Corrugated Paper Co. Inc. He joined the firm in 1951 as the director of its Merchandising Displays and Specialties Division, prior to which he was vice president of Einson-Freeman Co.

S. P. Boochever

R. E. Knowles

ROBERT E. KNOWLES, paper machine supervisor at Moraine Paper Co., West Carrollton, Ohio, has retired from full-time activity in the paper industry. He will make his home in Marlboro, N.H., and may in the future be available for consultation and special assignments. During his lifetime, Mr. Knowles has been associated with numerous paper manufacturing companies. Among these firms are the Chemical Paper Co., Nekoosa-Edwards Paper Co., Paper Corp. of America, American Writing Paper Corp., and Hopper Paper Co.

R. W. Hynes Named Chairman of Waste Paper Group

The newly established Waste Paper Utilization Council, which was formed January 1 with Henry J. Perry as director, has announced the election of Ronald W. Hynes as chairman. Mr. Hynes is president of Newton Falls Paper Mills. George Dyke, president of Robert Gair Co. Inc., was chosen vice chairman.

Members of the executive committee include F. C. Goodwill, resident manager of St. Regis Paper Co. at Kalamazoo, Mich.; Paul J. White of Great Eastern Packing & Paper Stock Co., and E. P. Ryan of Curtis Publishing Co. These officials together with the following form the joint committee of the Council: D. D. Yong of Fitchburg Paper Co., D. M. Dickson of Penn Paper & Stock Co., C. W. Gallup of New York & Pennsylvania Co., J. C. LaGrua of National Folding Box Co., D. F. Morris of the Mead Corp., and B. J. Taymans of Printing Industry of America.

WILLIAM A. PARKER, chairman of the board of Rayonier Inc., and president of Incorporated Investors of Boston, has been elected a director of the Northern Pacific Railway.

Stockholders of Badger Paper Mills, Peshtigo, Wis., have elected two new directors: *E. E. ERDMANN* and *W. J. VAN DYCK*. Mr. Erdmann is sales manager of the wrapping paper division, while Mr. Van Dyck is sales manager of the fine paper division. *F. J. LAUERMAN* was elected chairman of the board to succeed the late J. P. Pulliam.

A. H. MAHRT has been named chairman of the finance committee of The Mead Corp., Dayton, Ohio.

ERNEST E. LUDWIG, vice president of Bermingham Co., has been elected chairman of the advisory committee of the paper technology curriculum at Western Michigan College, Kalamazoo. He succeeds *FREDERICK B. CURTENIUS* of Kalamazoo Paper Co.

J. H. LAVANDOSKI, secretary of Strange Paper Co., Menasha, Wis., has been made executive vice president. He will continue as secretary. *J. M. LEVIN*, assistant secretary, has been advanced to the position of vice president of sales.

WILLIAM GASS has been named manager of the new plant of National Container Corp. at East St. Louis, Ill. He was formerly sales manager for Highland Box Co. of St. Louis.

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Sand handling installation at large Ohio foundry. Kalamazoo design and construction provides more usable space than ordinary multiple bins.

...here's the answer to your problems...

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GLAZED TILE INDUSTRIAL STORAGE BINS

Any shape or size engineered to meet your requirements . . . heavy, monolithic construction . . . smooth-surfaced . . . weatherproof, fire-proof, corrosion-proof . . . contents protected against freezing, condensation, spoilage, contamination . . . appearance that ties in with modern industrial buildings . . . long-lived. Send for complete details . . .

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The Paper Industry Necrology

Walter D. Randall

Walter DeGolyer Randall, associated with Champion Paper & Fibre Co. for a number of years in executive positions, died April 1 in Winter Park, Fla. He was 73.

Mr. Randall joined Champion in 1902 and was elected secretary-treasurer and a director of the firm in 1912. In 1920 he was named vice president and mill manager. He resigned in 1932 and was succeeded by his son, Herbert T. Randall, who today serves as a member of the board and as vice president and director of Champion research and engineering.

George E. Paine

George Eustis Paine, chairman of the board of directors of New York & Pennsylvania Co., died unexpectedly March 27 in New York, N.Y. He was 59. He had served as president of the company and had spent most of his business life with the concern. His father, Augustus G. Paine, had headed New York & Pennsylvania before him.

Mr. Paine was also chairman of the board of directors of Nypen Co.; a trustee of the Hanover Bank; a director and chairman of the executive committee of Fidelity-Phoenix Insurance Co., and a director and member of the executive committee of Great Northern Paper Co.

William Laird McCormick, secretary of Weyerhaeuser Timber Corp., died in Tacoma, Wash., March 26. He was 76. His association with the firm dated back to 1906, when he served as legal adviser to an affiliate of the organization at Klamath Falls, Ore. Prior to that time he had been employed by lumber companies in Wisconsin.

Abraham Mazer

Abraham Mazer, 77, chairman of the board of Hudson Pulp & Paper Corp., died March 27 in New York, N.Y. An immigrant who built a modest grocery bag manufacturing business into a $36,000,000 pulp and paper firm, he was credited with making the paper napkin commonplace in the American home. Hudson has plants in Palatka, Fla.; Bellows Falls, Vt.; Augusta, Maine, and Lansdowne, Pa., and owns timberlands in Maine and Florida. Mr. Mazer was one of the leading sponsors of the American-Israeli Paper Mill now under construction in Israel.

A native of the Ukraine, Mr. Mazer came to the United States in 1893. In 1895 he established a small wholesale jobbing business in New York, selling grocery bags to shopkeepers. He founded what is now Hudson Pulp & Paper in 1916.

Abraham Mazer

G. S. Witham, Jr.

George S. Witham Jr.

George S. Witham Jr., 72, who for many years was associated with Union Bag & Paper Corp. as mill superintendent, consulting engineer and inventor, died at his Hudson Falls, N.Y., home March 23. Mr. Witham and his father, under whom he had served his apprenticeship and who was himself outstanding in the papermaking industry, collaborated on inventions aimed at improving the manufacturing processes. Mr. Witham took over as general superintendent for Union Bag & Paper in 1927. At the time of his death he was occupied mainly with patent and consulting activities.

Martin V. Brooks, 90, at one time mill superintendent for Hammermill Paper Co., died at his home in Miamisburg, Ohio, April 5. He was retired superintendent of Miamisburg Paper Co. and had been in the industry 56 years.

Charles E. Alderman, purchasing agent for Hampden Glazed Paper & Card Co. until his retirement in 1951, died in Holyoke, Mass., April 6. He was 88.

Harry Fertig, until his retirement in 1929 president of Moore & Thompson Paper Mills of Bellows Falls, Vt., died March 31 in Miami Beach, Fla. He was 82. Mr. Fertig founded Hudson Paper Co. of Stamford, Conn., in 1911. He was at one time president of Hudson Bag Co. and Equitable Bag Co., both of Brooklyn.

H. Carson Crofts, 58, retired president of Illinois Box Mfg. Co., died April 10 in Los Angeles.

Harry W. Mathewson, 77, chairman of the board of Paper Supply Co., died April 8 in Minneapolis. Born in Menasha, Wis., he founded Paper Supply in 1908 and was active until his death. Mr. Mathewson was a past president of the National Paper Trade Association.

George S. Howland, president and treasurer of Thomas Phillips Co., died March 30 in Akron, Ohio.

Arthur L. Janes, 88, retired treasurer and director of Holyoke Card & Paper Co., died March 20 at his home in Springfield, Mass. He entered the employ of the paper firm in 1895 and retired in 1938.

George Wallum, a retired paper box manufacturer, died April 8 at his home in Eltingville, Staten Island, N. Y. He was 85.

William Joseph Pilz, 65, former president of Everett Pulp & Paper Co., Everett, Wash., died April 3.

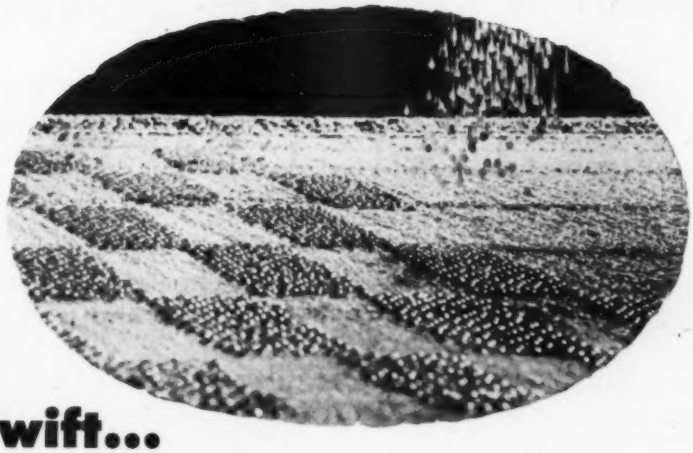
Morris Sayre, 69, president of Corn Industries Research Foundation Inc. and honorary chairman of Corn Products Refining Co., died at Zonguldak, Turkey, March 7. Mr. Sayre was in Turkey as a member of a group of businessmen delegated by Harold Stassen of the Mutual Security Agency to appraise the results of American aid. He was a former president of the National Association of Manufacturers.

Cyril W. Stairs, president of Maritime Paper Products Ltd., Halifax, N.S., died recently at the age of 61.

Everett L. Brooks, 55, president of Brooks Paper Co. at St. Louis, Mo., died March 8 while playing golf.

Melvin H. Kuhl, 52, assistant general manager of the Industrial Division of Timken Roller Bearing Co. since 1945 and a leader in civic affairs in Canton, Ohio, died recently.

Shown here is one phase of Swift's exclusive process. The protein liquor falls on a bed of dry finished product.



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a great boon to paper makers...

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Only Swift makes New Process Glue—a product of unexcelled purity and uniformity.

In Swift's exclusive process, protein liquor is extracted from fresh high-grade bones. The concentrated liquid falls in drops on a dry glue bed as illustrated. Then, by continuous and automatic process, the product is dried, milled and screened. The finished product must pass rigid laboratory tests for a number of chemical and physical factors.

Untouched by human hands, uncontaminated by foreign substances—New Process Glue is an odorless, light-colored, uniform protein.

Here's where Swift's New Process Glue serves the paper maker

- ***IN PIGMENT RETENTION***—The flocking action of New Process Glue promotes high retention of clay and titanium pigments . . . keeps fibre and filler on the wire . . . . helps increase the brightness and opacity of filler papers . . . promotes better fibre formation aiding in the production of a denser, stronger sheet.
- ***IN FLOTATION-TYPE SAVEALL SYSTEMS***—New Process Glue helps obtain clearer effluents because of its unusual ability to flock fibres and fillers.
- ***IN GETTING HIGHER PICK TESTS***—New Process Glue can serve as a partial replacement for starch in machine coating. It promotes better film formation and greater tensile strength than a total starch solution.

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Chicago 9, Illinois

This offer expires June 30, 1953

Please send your 100-lb. introductory shipment of Swift's New Process Glue at the quantity price, to be tested for use in our operations. We understand, if not fully satisfactory, it may be returned for credit at your expense.

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*Firm Name*_____

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*City*_____ *Zone*____ *State*_____

The Paper Industry Safety News

PRESENTATION of the Mead plaque to Escanaba Paper Co. is made by H. T. Mead, vice president (left), to E. G. Bennett, Escanaba general manager; the award program was held at the Delta Hotel in Escanaba, Mich.

Mead Safety Award Goes to Escanaba Paper

Escanaba Paper Co., Escanaba, Mich., has been awarded a plaque in recognition of its being "the safest mill in the Mead Corp. for the past year." The presentation was made during a banquet at the Delta Hotel in Escanaba by Talbot Mead, vice president of the corporation. Representing the winning mill and accepting the award was E. B. Bennett, president and general manager.

The plaque was donated some years ago by George H. Mead, founder of the firm, for competition among the various divisions of the corporation. It is kept a year by the winner and if won three times is kept permanently.

Following the major presentation, Francis Wagner, Mead safety director, awarded Robert Barron, plant safety supervisor, a silver bar celebrating the Escanaba record of only 1.86 lost-time accidents for every 1,000,000 man-hours.

Buckeye Cotton Oil Takes Honors in S. Association

With an accident frequency rate of 0.00 for 1,087,518 man-hours of exposure, Buckeye Cotton Oil Co. of Memphis, Tenn., led the list of competing mills in the 1952 contest of the Southern Pulp & Paper Safety Association. Two other mills had rates of less than 1.0. They were the Ecusta Paper Division of Ecusta Paper Corp., Pisgah Forest, N.C. (0.42 for 2,386,878 man-hours), and Gulf States Paper Corp., Tuscaloosa, Ala. (0.91 for 3,264,288 man-hours).

The overall frequency rate for member mills in 1952 was 9.78, down 3.4 per cent from the 10.13 reported during 1951. The rate for the first six months of 1952 was 8.87.

In the converting division, Gulf States Paper at Tuscaloosa took the honors among bag plants, with a 0.00 frequency rate for 1,077,669 man-hours worked. Second was International Paper Co. at Mobile, Ala., which reported a rate of 2.44 for 1,227,057 man-hours. The division had an overall rate of 8.78, as compared with 12.12 for 1951.

Leader in the box plants category was Union Bag & Paper Corp. at Savannah, Ga. The firm had a rate of 2.81. Man-hours of exposure totaled 487,180. Runner-up was the Southern Container Division of National Container Corp., Jacksonville, Fla., with a rate of 9.79 for 612,405 man-hours. The overall rate among box plants was 13.96, compared with 9.39 for 1951.

In woods operations, two firms reported accident frequency rates of 0.00. They were St. Regis Paper Co., Pensacola, Fla. (175,055 man-hours) and the Mead Corp., Lynchburg, Va. (4,136 man-hours). The overall rate among the seven firms reporting in the woods operations category was 20.75, down from the 49.29 of 1951.

APPA Broadens Safety Program

The Industrial Relations Committee of APPA, which has always included safety and accident-prevention in the scope of its activities, has embarked on a new industry-wide program aimed at reduction of lost-time accidents. The official announcement stated that the program will endeavor to lead the industry to a higher position among all industries in terms of safety. (Records show that the paper industry's present record is about the average for all industry.)

The committee has formulated an accident-prevention program of wide scope to help mills that do not have such a program and to offer suggestions for improvement to those that do. The plan is sufficiently flexible so that it can fit any organizational pattern. Under the program, the safety organization should be directed by the firm's executive manager; participation by officers of all grades and workers in every department is a feature.

Plans for '53 Congress Made at Ohio Meeting

Program details for the 1953 National Safety Congress' Pulp and Paper Section were formulated April 13 at the regular spring meeting of the section's executive committee. Twenty members were in attendance at the gathering, which was held at the Deshler-Wallick Hotel in Columbus, Ohio, on the day preceding the 23rd All-Ohio Safety Congress and Exhibit. (The national Congress is to be held October 19-23 at the Conrad Hilton Hotel, Chicago.)

New and current projects being undertaken by the Pulp and Paper Section were reported by the various sub-committees. The full cooperation of the National Safety Council was assured in remarks by Charles Alexander, manager of the NSC industrial department, and F. G. Pater, staff representative. In charge of the meeting was A. E. Minor, safety supervisor for the Ontario-Minnesota Pulp & Paper Co. Ltd.

Committee members were guests of

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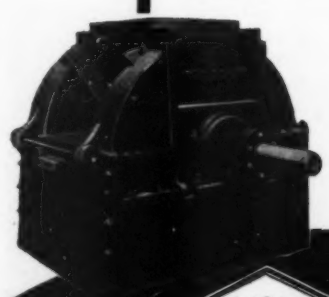

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EXECUTIVE COMMITTEE of the NSC Pulp and Paper Section meets at the Deshler-Wallick Hotel in Columbus; fourth from the left (seated) is F. G. Pater, NSC staff representative; at the head of the table is A. E. Minor of Ontario-Minnesota Pulp & Paper Co. Ltd., committee chairman, while to his left is Charles Alexander, manager of the NSC industrial department

the Mead Corp. for a tour of that firm's pulp and paper mills at Chillicothe. They were guests at a luncheon in the mill cafeteria and in the evening attended a banquet at which Mr. and Mrs. Francis H. Wagner were hosts for Mead.

All-Ohio Congress

Meetings of the Paper and Paper Products Section of the Ohio group were under the direction of George W. Bryan, employment and safety director for Sorg Paper Co., Middletown. Kent Castor, safety supervisor for Mead, was vice chairman; serving as secretary was Robert Newbold, employment and safety supervisor for Oxford-Miami Paper Co., West Carrollton, Ohio.

Following Mr. Bryan's annual report, a discussion of "Barnyard Economics and Safety" was presented by William F. Johnston, supervisor of safety and training for Armco Steel Corp., Middletown. Other speakers during the first day's program of the paper group were W. R. Middendorf of the American Red Cross and Walter Engle, a sales representative for American Optical Co.

A "Forum for Safety" highlighted the second day's schedule. The moderator was Miss Kay Taylor of American Mutual Liability Insurance Co., Boston. Wayne Stouder of American Mutual's Indianapolis office participated. Concluding the program was an address by William Wright, assistant employment manager of Champion Paper & Fibre Co., Hamilton. The title of his talk was "Name Your Subject."

Francis Wagner, director of safety for Mead, spoke before a luncheon meeting of the American Society of Safety Engineers. Also on the program was Ralph Z. Moore, director of industrial relations for Apex Electrical Mfg. Co., Cleveland.

HARLEY GOODRICH, junior past chairman of the NSC's Pulp and Paper Section, suffered a cerebral thrombosis while attending the executive committee meeting of the section in Columbus. Taken to a Columbus hospital, his condition was reported as good by the attending physician; however, he was expected to remain in the hospital for at least three weeks. Mr. Goodrich is maintenance and safety engineer for Strathmore Paper Co., West Springfield, Mass.

Abitibi Division Wins Fifth 1952 Award

Presentation recently of the Ontario Pulp & Paper Makers' Safety Association award to the Fort William (Ont.) division of Abitibi Power & Paper Co. Ltd. brought to five the number of safety awards won by the division for 1952 performance. The OPPMSA shield is awarded annually to that mill in Class "A" (more than 50,000 man-hours monthly) with the best safety record for the year.

J. T. Carey, mill manager, received the trophy from Fred W. Braun, vice president of Employers Mutual Insurance Companies of Wisconsin, who addressed the 38th annual luncheon of the Ontario safety group in Toronto. The Fort William mill not only had no lost-time accidents during 1952 but established a record of 500 consecutive days without a lost-time accident.

The four other national and international safety honors won by the mill recently include: (1) "Safest Mill in Canada" contest sponsored by *Pulp & Paper Magazine of Canada* for Class "B" mills of less than 75,000 man-hours monthly; (2) National Safety Council plaque, open to Group "C" mills in the United States and Canada; (3) Northwestern Branch of the OPPMSA shield for the period March 1, 1952, to August 31, 1952, and (4) the Abitibi Challenge Cup for the second quarter of 1952 in competition with other Abitibi mills.

456 Entrants in 1953 NSC Industry Contest

According to a report issued recently by the National Safety Council, there are 456 entrants in the 1953 Paper Industry Safety Contest. Of these, 425 reported for February, 271 of them showing perfect records.

The three mills working the most man-hours in February with no lost-time accidents were as follows: Champion Paper & Fibre Co. at Hamilton, Ohio, and Canton, N.C.; and Union Bag & Paper Co., Savannah (Ga.) bag plant. The perfect records reported for January and February total 210.

Three U. S. F. S. Stations Honored for Safety Record

The National Safety Council has awarded Certificates of Commendation to three forest and range experiment stations of the U.S. Forest Service. The awards were made in recognition of the number of man-hours worked without a disabling injury. Richard McArdle, chief of the U. S. F. S., presented the honors at a Washington, D.C., meeting of all station directors and regional foresters.

Stations receiving the awards were: Pacific Northwest (Washington and Oregon) for 547,995 man-hours between January 1, 1949, and December 31, 1952; Rocky Mountain (Colorado, Kansas, eastern Wyoming, Nebraska, and South Dakota) for 216,109 man-hours between January 1, 1949, and December 31, 1952, and Southeastern (Virginia, North Carolina, South Carolina, Georgia, and Florida) for 253,663 man-hours in 1952.

Mr. McArdle praised the various regions and stations for their record during the past year. Highlights in the acomplishments of 1952, he said, included: reduction in automobile and truck accidents from 248 in 1951 to 213 in 1952; reduction in lost-time accidents from 543 in 1951 to 400 in 1952, and reports of no disabling injuries from 41 of the 152 national forests.

Special award

The Allegheny National Forest received special recognition from Mr. McArdle for its record of nearly 6½ years without a lost-time accident. This is the longest injury-free period achieved by any national forest.

Because many of its field employees are engaged in hazardous work in isolated areas where aid is not readily available, the Forest Service emphasizes accident prevention. Regions aim for 12 or less lost-time injuries for each 1,000,000 man-hours worked and a rate of one day or less lost time for each 1,000 man-hours worked.

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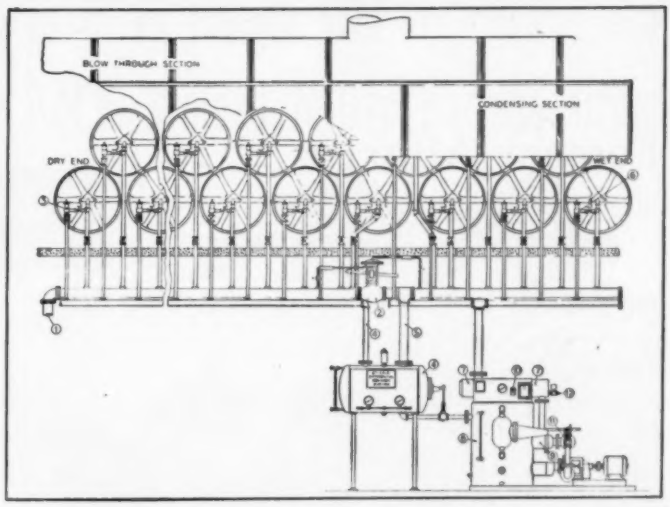

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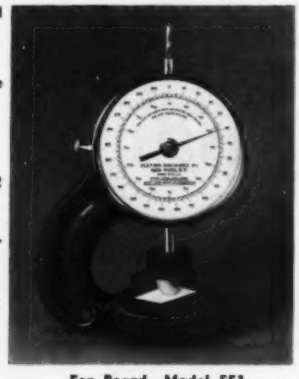

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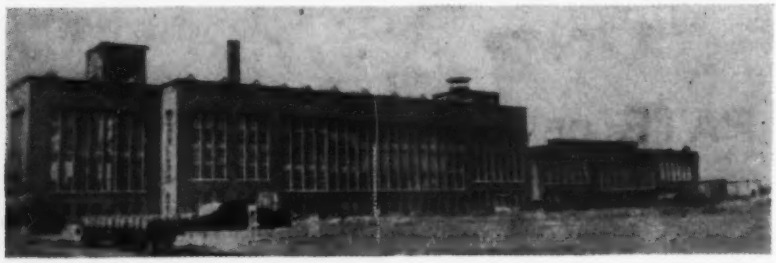


Fig. 1—Straw pulp mill at Arnhem

The most modern straw pulp mill

The N. V. Maatschappij tot Stroveredling "Sove," at Arnhem, Holland, has constructed what this anonymous author terms "the most modern straw pulp mill in the world." The present article gives a brief description of the mill (Fig. 1), which has a daily production capacity of about 30-35 tons of bleached straw pulp. Fourteen illustrations are given.

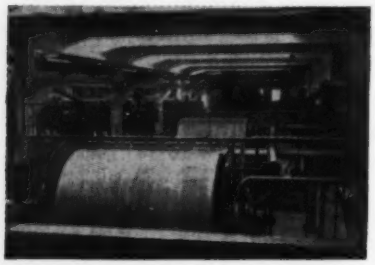


Fig. 2—Packmann filters

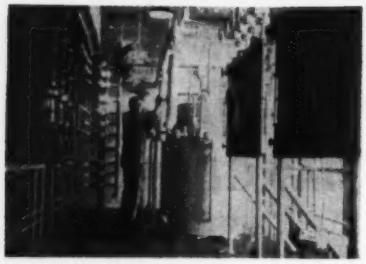


Fig. 3—Bleaching towers

The so-called "celdecor" method (which resembles the Pomilio process) is used. The straw bales of 40-50 kilos are cut with Nyblad choppers, and a series of cyclonic dusters are used. Electromagnets are required to remove iron impurities, which may be as high as 2 per cent. The initial impregnation at 90° is carried out with aqueous sodium hydroxide, and at this point the straw takes up 3.5 per cent of its weight of alkali. The cook (which requires seven hours, with a maximum temperature of 120° C.) causes the consumption of 10-11 per cent alkali based on the dry weight of the straw. At the base of the digester the pH is about 10.5.

The article describes briefly the subsequent disintegration and washing operations (with very dilute chlorine water), which should lower the alkalinity to at least pH 9, but preferably to pH 7. Carefully regulated chlorination is carried out in two batteries of three towers each (made of glazed stoneware). Chlorine consumption is about 13 per cent of the halfstuff. The pulp is then led to Packmann vacuum filters (Fig. 2), followed by very dilute alkaline wash (at 10-12° C.), conducted again to Packmann filters, and then screened using Johnson screens, followed by Celdecor centrifugal classifiers, with carefully controlled density regulating (i.e., 7 gm. per liter). Perforations in the first series of Celdecors are 1.5 mm.; those in the second series are 0.6 mm. in diameter. Rejects (about 15 per cent) from the first Packmann filters are sent to a battery of Dirtecs. In the bleaching towers (Fig. 3) the active chlorine consumption at 30° C. is about 1-1.5 per cent (stock density being about 3-4 per cent); thence, the pulp is led to Bellmer bleaching tanks, where another 0.5-0.6 per cent chlorine is taken up. Pulp brightness should then be about 87 per cent. Neutralization is then effected by using sodium sulfite (usually 0.3-0.5 per cent).

The wet machines used are given only a very brief description. Ordinarily, the pulp is shipped with 20 per cent moisture. Anonymous. *Papeterie,* 75, 9, 11, 13, 15-16 (1953). (In French.) (The periodical from which this article is taken is printed on paper containing about 75 per cent of this "Sove" bleached straw pulp, and 20 per cent ash.)

Sulfidity and alkaline pulping of beechwood

Beechwood chips are treated with liquors ranging in sulfidity from 0-30 per cent, with frequent reference to previous studies by Jayme, Wagenbach and Deloff (*Papier-Fabr.,* 37, 229-35; 240-3 [1939]). The alkali concentration is constant at 3 per cent. Of this, 10 per cent is present as sodium carbonate. Only the percentages of sodium hydroxide and sodium sulfite vary. The cooking period is 5.5 hours (with 3 hours at the maximum temperature of 160°).

The authors describe briefly the physical and chemical testing methods and furnish graphs and tabulated data. The optimum (average) sulfidity is 20 per cent, which is far below the range given by Rothrock and Nolan for scrub oak (*Tappi,* 35, 29-37 [1952]). Cooking liquors of low sulfidity still give good pulps. For example, a 5 per cent sulfidity gives a pulp yield equal to that obtained with 20 per cent sulfidity, and the product is low in screenings and can still be bleached; the over-all quality number of the pulp is also satisfactory.

The beneficial effects of low sulfidities may perhaps be ascribed to the chemical constitution of the protolignin of this species, which is richer in methoxyl groups and which does not condense rapidly to higher polymeric form (in contrast to spruce protolignin). Thus, the solution process may be promoted by relatively low amounts of sodium sulfide. Furthermore, the percentage of lignin in beechwood is higher than that in spruce. (Similar low sulfidity cooking conditions may hold for the pulping of annual plants.)

The practical significance of low sulfidity pulping will manifest itself especially in densely populated areas where kraft cooking of beechwood (or straws) is planned. Due to anticipated odor problems, preference, so far, has been given to the soda process, despite the weaker pulps given by the latter. Georg Jayme and Werner Licht. *Das Papier,* 6, 450-6; 510-13 (1952). (In German.)

Water extraction for paper machines

The general fuel shortage (especially acute in Switzerland) makes it imperative to reduce heat consumption in paper machine operation. One of the methods is to extract as much water as possible at the wet end of the machine and to effect this economically. Thus turbo-machines are introduced in the place of water ring pumps. The former have a much higher adiabatic efficiency, with the result that savings of 30-60 per cent are effected in power input. Furthermore, the heat of compression generated in the turbair blower can be used at the dry end of the machine, and this improves considerably the over-all heat balance.

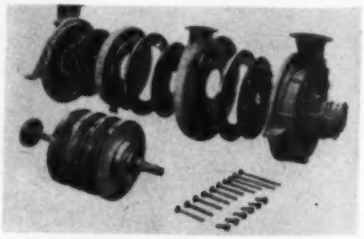
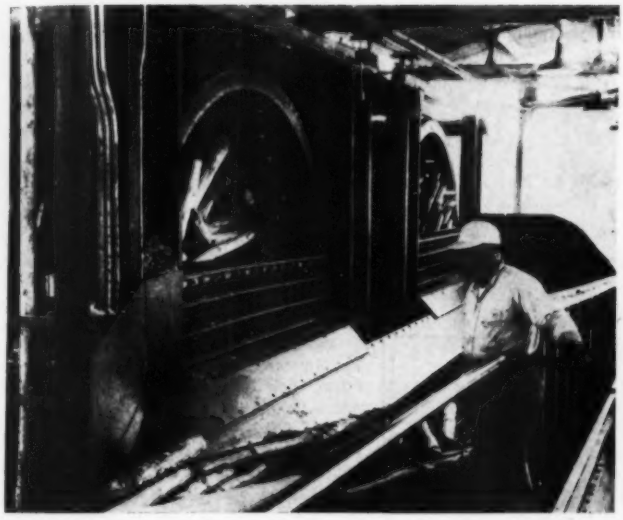
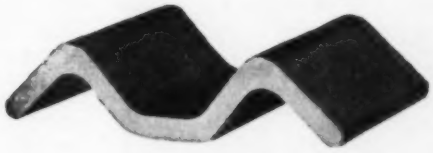


Fig. 1—Sulzer Turbair Blower KRC component parts

The Sulzer Turbair blower is an open heat pump drawing cold air from boxes and suction rolls and expelling it when heated into the dryer portion. The cycle is closed

Bark Hard or Soft Woods up to 8′ in Length Wet . . . Dry . . . or Combined Dry and Wet With F.M.P. Welded M-Bar Barking Drums





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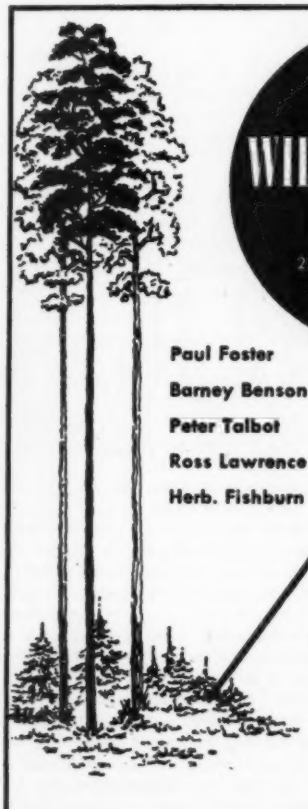

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Fig. 2—Opened RC Sulzer Blower

again by way of the atmosphere. The use of turbo-blowers is made possible by the provision of highly efficient cyclone water separators which permit the separation of air and water between the suction areas of the paper machine and blower. The high efficiency of these units prevents the slow build-up of deposits in the blower ducts by fibers, fillers or size carried by the water.

The author discusses the vacua required in paper machines, the component parts of the Sulzer blower (cf. Fig. 1) and its simplicity of construction. It closely resembles a multistage centrifugal pump, and its maintenance presents no unusual problems. Various blower installations are shown. (Three sizes are manufactured which are sufficient to service the usual small or medium sized paper machines of Europe.) Large machines require specially designed blowers, the construction of one of which is fully described (cf. Fig. 2).

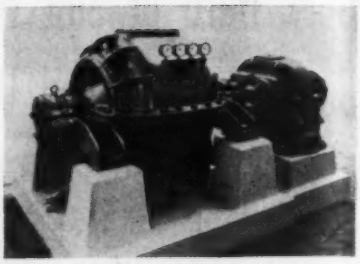


Fig. 3—Blower for a mill in Norway

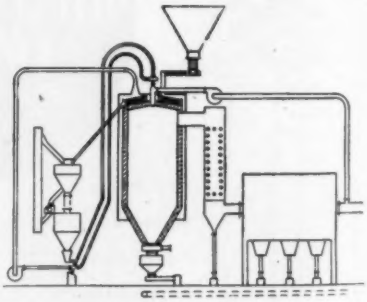
In practice, in the Netstal Paper Mill in Switzerland (which in a way serves as an experimental plant) two blowers were installed (one in 1944, and one in 1945). The second blower permits a power saving of 58 per cent. (Thus, the capital outlay was written off within two years.)

Besides Switzerland, blowers have been or are being installed in Norway (cf. Fig. 3), Sweden, Finland, England, France and Italy. They are particularly advantageous when the cost of electric power is high. Robert Thomann. *Norsk Skogindustri*, 7, 42-48 (1953). (In English.)

Efficiency of a pyrites roaster

A Nichols-Freeman pyrites flash roaster (cf. accompanying figure) has been operating for nearly ten years at the sulfite mill at Nokia, and the technical manager reports briefly on how this equipment has functioned, and the best conditions for its operation.

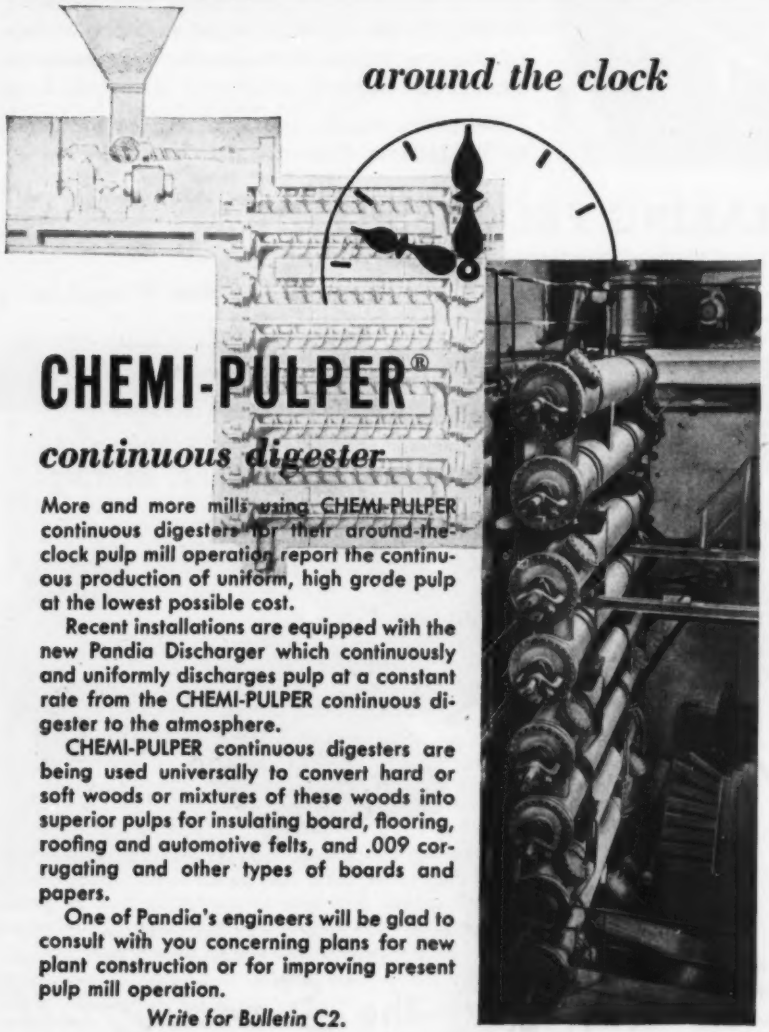
Only such pyrites charges which pass completely through a 0.12 mm. mesh screen are used, and the moisture content of the ore is less than 0.5 per cent. The higher the temperature in the combustion chamber, the less are the sulfur losses (both as unburned sulfur and sulfur trioxide). The roaster "load" can vary from 100 per cent



Nichols-Freeman pyrites roaster

down to 25 per cent, but with this lower load, care has to be exercised that the gas temperature does not fall below 300° C. before reaching the cooling tower. By maintaining a high temperature in the combustion chamber, and using washed gases in the recirculation, sulfur losses are about 4 per cent of the input. Under very favorable conditions (using pyrites free of zinc) losses can be reduced to 3 per cent. Depending on the temperature of water fed into the boiler, from 3.1 to 3.6 kilograms of saturated steam can be generated per kilo of pyrites.

Power consumption of the roaster itself is about 25 K.W.H. per ton of ore roasted,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but to this 13 K.W.H. has to be added for maintenance of electrical precipitators, tower gas fans, *et al.* The pyrites predryer consumes about 1.35 K.W.H. per kilogram of water evaporated (but the heating of water to 50° C. is also included in this figure). The labor requirement for a roaster is one man per shift. Maintenance costs are moderately low, and consist largely of cleaning the boiler, packing stuffing boxes and changing the burner nozzle and pyrites feeder screw. Lennart Broman. *Paper and Timber* (Finland), **35**, 40-43 (1953). (Original in Swedish, with English summary.)

Groundwood rejects; their use in insulating board

The complete removal of rejects obtained from the coarse screening stage in the groundwood process is recommended. These rejects can then be used in the production of insulating board. The rejects apparently consist largely of sapwood whose properties have been modified during storage; they also give trouble in any attempted sulfite cook. If such rejects were refined further, a high energy consumption would be required, and any paper containing the product would show poorer qualities.

The method developed by the author is that of Swedish patent 135,719. The rejects are first washed clear of adhering good fibers. (This is considered a very important step.) These "cleaned" rejects are then mixed with cement, pressed, and dried. When the rejects obtained by grinding stored wood are to be used, no further comminution is required. The amount of such rejects varies usually from 0.5 to 4.0 per cent. They may be pressed and stored for several years prior to use.

The properties of the board (termed "Optima") and its uses are described. M. Martinson. *Svensk Papperstidn.*, **55**, 727-33 (1952). (Original in Swedish.) Through *Bull. Inst. Paper Chem.*, **23**, 237 (1952).

Cold purification of sulfate pulps for viscose

Caustic soda treatments in the cold are applied separately to kraft pulps before bleaching, after the chlorination stage of the bleaching operation, and also after the bleaching has been complete. Whereas the application of alkali prior to the bleach, effects relatively little loss in yield (about 12 per cent) it does effect a chlorine saving of 25 per cent in the subsequent bleaching operation. The most effective purification, however, is obtained on alkaline treatment (with 9 per cent caustic soda) after bleaching, resulting in an alpha cellulose content of 97 per cent. The combined loss in yield on bleaching and purification, however, is about 20 per cent, and the over-all pulp yield (based on the original wood) is 32 per cent.

A sufficiently high grade viscose pulp (93-94 per cent) is obtained when the bleached pulp is treated with cold 6 per cent caustic soda for ¾ hour. The resulting pulp contains about 93-94 per cent alpha, a cuprammonium viscosity of about 20 centipoises, and an over-all loss in yield (based on unbleached pulp) of about 14 per cent. Wlodzimierz Surewicz. *Przeglad Papier*, **8**, 233-4 (1952). (Original in Polish)—through *C.A.*, **47**, 2984 (1953).

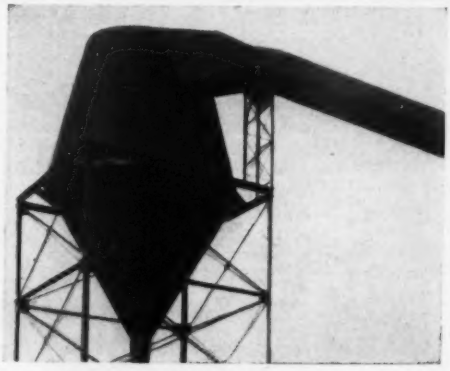
Modern manufacture of straw pulp

The manufacture of soda and sulfate pulps from straw, and their properties, are dealt with briefly. Pulps by the Celdecor-Pomilio **(I)**, sodium sulfite **(II)** and chemi-groundwood **(III)** processes are also discussed, as are the recovery of spent liquors from I and III.

Strength properties of pulps from I compare favorably with those of hard sulfite wood pulps used in papermaking, with the possible exception of folding endurance (although this is so variable that no general conclusions can be drawn). Burst, tensile strength and brightness of pulps made by I are much stronger that the ones from II.

Straw pulps show good sheet formation and can be sized readily, but apparently their dimensional stability is less than that of esparto pulps. Tabulated data are also given on the strength properties of writing, cartridge, and typewriting papers made with and without varying amounts of straw pulps. In at least one case, a writing paper from a 100 per cent straw pulp showed over-all better strength properties than did one from 100 per cent wood pulp.

Papers in which straw pulps can be used effectively are discussed. Prehydrolysis of straw leads to pulps low in α-cellulose (30 per cent, compared with 40 per cent from wood), hence dissolving pulps from straw are probably uneconomical. C. B. Tabb. *Papeterie*, 75, 17, 19, 21, 23, 25 (1953). (In French.)



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Slow-speed, Low power Exhaust fans.
Shavings and Dust-collecting Systems.
Self-clearing Mains, Straight and Circuit.
Storage vaults and Rotary unloaders.
Positive Pneumatic Conveyors.
Wood-fuel Furnace Stokers.

Conveyors

BLOW CHIPS, HOGGED BARK, ETC. 3,000 FEET, 2,000 POUNDS PER MINUTE

Vaults

STORE CHIPS AND REHANDLE WITHOUT MANUAL LABOR. 22,000 CUBIC FEET OR LESS.

Stokers

FEED SHAVINGS, SAWDUST, HOGGED CRATES, BOXES, SKIDS ETC., AND BARK TO FURNACES FOR MAXIMUM STEAM PRODUCTION.

THE ALLINGTON & CURTIS MFG. CO.
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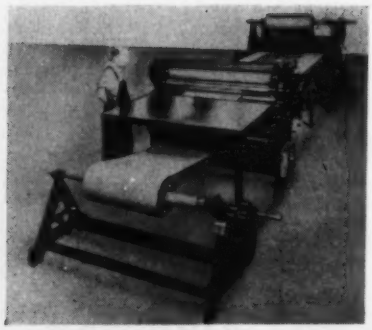


Laminating machine

A new laminating machine now on the market is a 50 in. wide combination conveyor gluing machine and laminator, which will laminate materials such as paper, leatherette, cork, etc.

The machine is designed for sheet and webs continuous lamination. Materials of varying thickness can be combined. Coatings of adhesive are easily controlled by a single adjustment of a dial. For hot glues an electric glue heater in the tank keeps the adhesive at the correct consistency. The tank is removable for cleaning.

An over-running clutch and auxiliary drive on the coating unit permits the coating rollers to run continuously. This eliminates the possibility of adhesive drying on the rollers. A single adjustment controls the pressure over the entire surface of the combining rollers. The machine is equipped with two unwind stands to handle 40 in. diameter rolls of material with a shaft-type rewind and Reeves variable speed drive. A tightening device is provided for the canvas conveyor belt. *Potdevin Machine Co., 285 North St., Teterboro, N.J.*

Chain saw

The new Timberhog Bantam chain saw, recently introduced, has a number of distinguishing features for one-man operation.

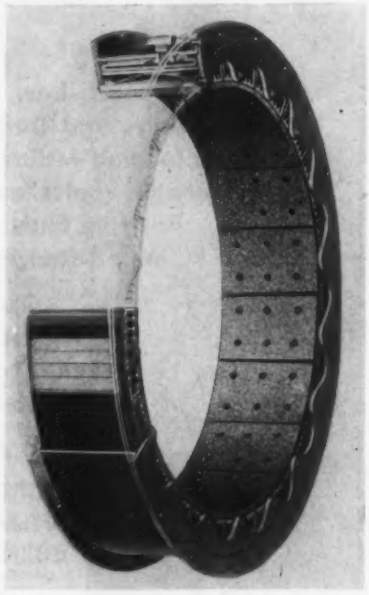
Fingertip controls and full 360° swivelling provide easy handling in all cutting positions. The swivelling mechanism can be instantly set at any angle for notching and felling cuts. An automatic chain oiler is a new innovation which maintains a flow of oil to the chain during all cuts. The newly-designed narrow guide bar is particularly useful for pulpwood cutting, and the planer-type chain provides fast cutting of all timber. Quick starting under all conditions is made possible by the rewind starter and flywheel-type magneto. An automatic clutch brings the sawing chain to a halt when the engine is idling.

Use of aluminum and magnesium parts makes possible light weight and yet affords ruggedness to withstand hard usage. *Reed-Prentice Corp., Worcester 4, Mass.*

Hydraulic lifter

A hydraulic lifter for raising and lowering heavy rolls in restricted areas, which is now on the market, will load and unload rolls of paper and other material weighing up to 1,000 lb. from presses, looms and other roll feed machinery. This lifter protects rolls of materials from being damaged, speeds up roll changing and handling, and, in many cases, enables one man to do the job. It eliminates the need for overhead cranes and slings and increases safety.

The lifter is custom built to suit individual requirements. It may be furnished with trunions or with a scoop. For horizontal movement, the lifter is mounted on four unbreakable steel casters, two rigid and two swivel for easy steering. A floor lock can also be furnished. Wheelbase dimensions are kept small so the lifter can be maneuvered through narrow aisles and between closely spaced machinery. *Service Caster & Truck Corp., Albion, Mich.*



Air-operated clutch

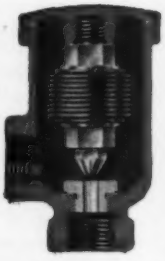
A new air-operated industrial clutch, known as Type VC Air-Ring clutch, has recently been introduced to the market. This completely ventilated clutch of the rigid type provides for transmission of power from the friction shoes through the torque bars to the metal side plates of the assembly.

Field tests of this new unit reveal that it is unmatched for heavy-duty service, with high-starting loads and sustained slippage where generated operating heat lowers clutch efficiency and shortens operating life.

Unique design features include: cooler operation inherent in drum clutch design, in addition to isolation of the operating tube from the heat-generating friction surface; riveted, replaceable friction lining; and loose, expanding operating tube which can be replaced without removing the clutch from the shaft.

This new unit is manufactured in sizes ranging from 12-in. through 42-in. drum diameters, with torque capacities ranging from 27,000-in. lb. to 380,000-in. lb. *Federal Fawick Corp., Fawick Airflex Div., 9919 Clinton Rd., Cleveland 11, Ohio.*

Steam trap



A new Type D thermostatic bellows steam trap has recently been added to the Nicholson line. This trap is smaller in size, capacity and price than other types made by this company and is intended to meet the requirement of many applications for a smaller trap.

The trap embodies several improved design features, including generous sized hexagon shanks to accommodate standard wrenches for installing or removing bellows and valve, thus eliminating strain on the bellows element; rugged internal guide rod and tube for maintaining alignment of valve and seat, as well as removable hardened stainless steel valve and seat.

Made of bronze construction, this steam trap is made in four pipe sizes in angle type only for pressure from vacuum to 200 lb. *W. H. Nicholson & Co., Wilkes-Barre, Pa.*

Lubricator

The Oil-Mist lubricator with one-gallon oil reservoir and built-in automatic warning switch which signals the operator by horn and red light, has recently been announced. A unit with 12-oz. reservoir is also available with a built-in warning switch.

A previous model, through employment of a solenoid switch, gave lubrication when the machine on which it was used was in operation, but had provision only for visual measurement of oil remaining in the reservoir. The gallon-size reservoir cuts frequence of filling, and the signalling device makes it impossible for the unit to run dry accidentally.

Two models of units with gallon reservoirs are available. Model 4958 has a switch which sets off an immediate warning by red light and/or horn when the level of the oil goes below 23 oz. Model 4859 has a closed switch which breaks contact when the oil level goes below 23 oz. and shuts

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There's hardly a valving job in pulp-and-paper mill operation where DeZurik Valves haven't been *proved superior* in actual, successful service. They're known throughout the industry for leak-free, trouble-free performance on all types of flow, from air to clay, from fibrous matter to resinous compounds. The exclusive DeZurik RUBBER-FACED PLUG is self-compensating — it keeps closing drip-tight *every time on any line!*

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Specialists in WAXES for the paper and insulating trade

Laminating . . . Paper Coating . . .
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Special blends for paper converting.

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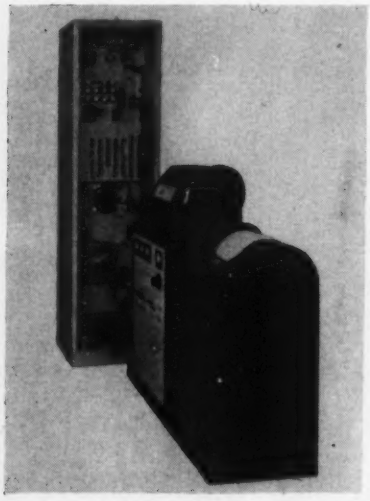
off the machine. Two new models of lubricators with 12-oz. reservoirs having low-level signalling devices are Model 4960, which shuts off the machine as the oil level drops, and Model 4961, which either sets off a warning horn or flashes a red light when oil falls to the 2-oz. mark. *Stewart-Warner Corp., Alemite Div., 1826 Diversey Pkwy., Chicago 14, Ill.*



Scanning system

A new rapid scanning system known as the "Telescan" has recently been announced.

This Metrotype system of numerical recording and telemetering makes printed records of process data directly from the primary information. Readings are presented in numerical form, tabulated for convenient use on a single page for easy handling and storage. It reads voltage, current, power, temperature, flow or anything else that can be translated to an electrical indication with a suitable transducer. Telescan also sets up an alarm for any abnormal condition.

Messages are stored in the form of teletype tape and read by the tape transmitter. Readings are printed at the rate of one per second, but tape is punched at the rate of 25 digits per second. Tape can be used to operate directly into automatic business machines for computation. Readings can be printed locally or transmitted any distance. *Tigerman Engineering Co., 4332 North Western Ave., Chicago 18, Ill.*

Voltammeter

The Amprobe "300," a new pocket-size voltammeter with nine ranges up to 300 amps. and 600 v, has just been introduced. The instrument is of the "snap-around" type, which enables the user to measure current instantly without shutting down equipment or making ammeter connections.

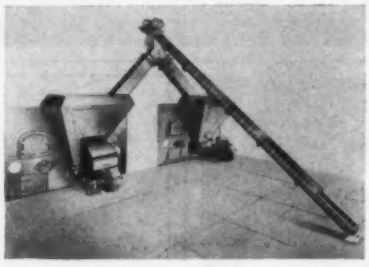
Voltage test leads are equipped with a new retractable safety plug, which automatically insulates itself when removed from the meter. Jaws are completely insulated down into the sockets, protecting against shorts and shocks. Probe jaws are pointed for working in crowded switch and terminal boxes. A no-rim window provides the scale with unobstructed light from the sides.

Some of the uses of this instrument are: determining load conditions, checking motor overloads, balancing loads, locating grounds, tracing shorts, start and run currents, relay settings, etc. *Pyramid Instrument Corp., Lynbrook, N.Y.*

Conveyor belt

A conveyor belt with an extremely dirt and abrasion resistant Poly-Vinyl coating has recently been introduced.

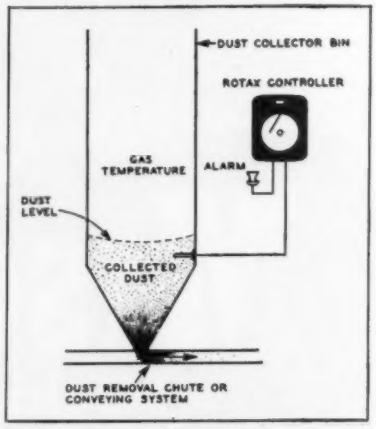
The pores of this belt are so minute that they do not readily collect dust, nor does the belt surface become soiled under normal operating conditions. While the surface of the belt is extremely dense, the belt is flexible and is said to give long service. *Main Belting Co., Room 286, 1241 Carpenter St., Philadelphia 47, Pa.*



Conveyor

The screw feed used in coal stokers has been adapted and is proving successful as a large scale automatic conveyor. Called "Flo-Tubes," the cast iron trough is bolted together in sections, capped with steel plates removable for inspection, and inserted in the bottom of a bin or pile, with the end left exposed for pick-up. The conveyor on an incline fills one hopper directly or two hoppers by a Y chute arrangement at the top end. Horizontally, a single "Flo-Tube" using gate valves will feed two, three or a battery of hoppers. High and low levels in hoppers are maintained by "off-on" switches automatically starting and stopping the screw feed.

Apart from coal, much interest is being expressed for handling of bulk materials such as grain, pellets, flakes, seed, chips, etc. *Canton Stoker Corp., Andrew Place S. W., Canton, Ohio.*



Dust level control system

Dust collected in a precipitator is automatically measured and the bin level controlled by the Model 40 Rotax controller.

A temperature bulb, mounted inside the precipitator, normally senses the higher temperatures of the flue gases from which the dust is precipitated. When the dust deposit covers the bulb (acting as insulation), the controller, responding to the resulting lower temperature, completes an electrical circuit through its Rotax contacts to sound an alarm and alert the operator.

Also, the Rotax controller can be installed to operate a screw conveyor, belt or other motor-driven equipment, automatically emptying the bin or tank when the desired level is reached. The system is equally effective for most bulk materials, provided their temperature in the bin is considerably above or below the ambient temperature. *Foxboro Co., Foxboro, Mass.*

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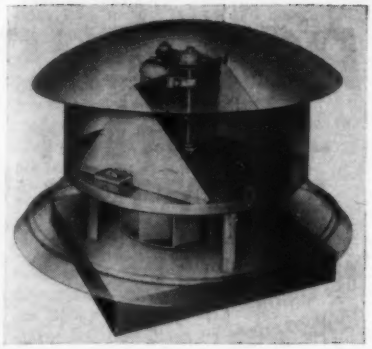
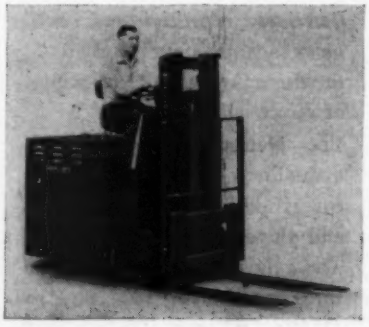


Roof exhauster

The production of a new centrifugal fan-type roof exhauster for air and fume exhaust against static suction has recently been announced. This unit consists of a motor-driven fan in a weatherproof housing and is guaranteed to provide controlled ventilation at all times. The frame is of heavy welded structural steel, and the motor mount and shaft-support is of heavy plate. The weatherproof housing is constructed of heavy galvanized iron or other metal. The unit is engineered to handle large volumes of air at static suction.

Specific types of vertical discharge roof ventilators are designed for industrial buildings where a considerable amount of oil, dust and fumes is in suspension in the air. Various sizes and capacities are manufactured to meet particular requirements. Power-flow roof ventilators or exhausters can be used for air exhaust or intake, either with or without duct systems. *General Blower Co., Morton Grove 10, Ill.*



Fork truck

A new short turning compact fork truck chassis of 3,000 lb. load rating at 24 in. load center is designated as Model A-3444. The short turning radius permits right angle stacking in a 10 ft. aisle with a 48 in. long load. The chassis incorporates the many features of the 2,000 lb. capacity "Jeep" Model 230. *Mercury Mfg. Co., 4044 South Halsted St., Chicago 9, Ill.*

Magnetic fixture

An aid to ultrasonic thickness testing with the Audigage thickness tester is a new magnetic fixture which is used to hold the searching unit against the plate being tested. This accessory assures good contact, prevents accidental shifting of the searching unit during tests, and permits one man to operate the instrument alone in different locations. It is particularly valuable when working on ladders or staging, and when test points are beyond easy reach, such as sulfate and sulfite digesters.

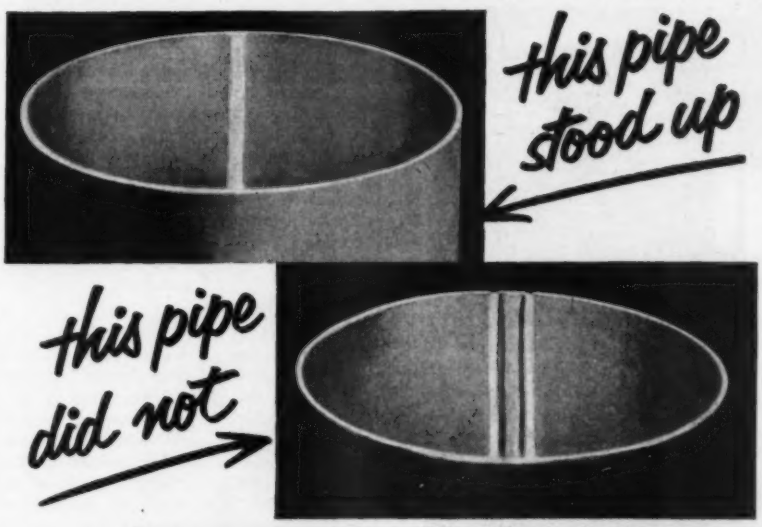
The fixture consists of a flat spring with an Alnico permanent magnet coupled flexibly to each end, and means for attaching the searching unit quickly and easily to its center. The standard magnets are of sufficient strength to hold the unit properly against surfaces that are slightly irregular or covered with a thin coat of paint; heavier magnets can be provided for use on cast iron and other rough surfaces, or on plates that are covered with thick coatings of paint or scale. The standard fixture is only five inches wide and weighs six ounces. *Branson Instruments, Inc., 430 Fairfield Ave., Stamford, Conn.*

Floor patching material

A new, improved product, known as superset "Tampatch," is used to repair holes, ruts and other imperfections in concrete floors of all kinds. Essentially, all that is needed is to clean and bond the surface to be patched, dump in the required material and tamp firmly into place. The patched area may be placed in service almost instantly. The patch becomes smooth with moving traffic and will withstand heavy loads.

This material is composed of specially prepared aggregates coated with fast drying synthetic resins and combined with asphaltic oils. It is shipped in drums of various sizes, ready to use without mixing. When the

After a 32-hour acid test...



It pays to specify SWEPCO Annealed Machine Welded Pipe

In a recent test, two pieces of 6" O.D. stainless steel welded pipe, Type 316, were placed in a solution of 3% hydrofloric and 10% nitric acid. One was annealed—the other was not.

After 32 hours, the unannealed pipe (at bottom) was corroded on each side of the weld heat zone, where carbide precipitation had taken place during welding. This pipe was rendered useless.

The annealed piece, however, was sound as ever. Annealing having eliminated carbide precipitation, no corrosion set in.

For long service and best results, specify Swepco machine welded pipe—annealed, pickled and passivated. If contamination only is your problem, ask for Swepco select or mill grade.

Swepco pipe, tubing and welding fittings, 3" to 18" I.P.S., are obtainable in *stainless steel, nickel alloys, Carpenter "20," Hastelloy alloy, and other metals.* Material is available for FAST DELIVERY and can be furnished in long lengths.

Lick the corrosion problem in your plant by writing today for complete illustrated information.

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pulp and SARAN RUBBER* go hand in hand!

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The extraordinary resistance of Saran Rubber to corrosives makes it an outstanding pipe material for bleached and unbleached pulp, white water, bleach solutions and waste liquors.

Michigan Pipe Company, manufacturers of famous, dependable MPC Wood-Lined Steel Pipe, also offers the paper industry MPC SARAN RUBBER-LINED STEEL PIPE. Available in either fabricated light gauge steel or standard steel, in 10' and 20' standard lengths ranging in diameter from 8" up . . . or fabricated to your exact requirements.

We invite you to submit your particular pipe corrosion problem to our Application Engineering Department.

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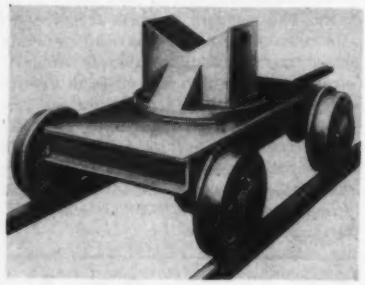
container is kept air tight, the material will keep indefinitely. The bonding material is delivered separately and is also available in various size containers. *United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio.*



Tote truck

A new aid in the moving of all calender, embossing and other press rolls, as well as similar products of great bulk and weight, the Epco tote truck is used in tandem so loads can be moved around corners or along curved trackage with ease. Each tote truck has a ball-bearing turntable on the top, and the wheel hubs are made with heavy-duty type Timken bearings. The safety factor was given top consideration in the designing and construction of these trucks. *Engineering Products Co., Inc., 122 South Michigan Ave., Chicago 3, Ill.*

Sizing glue

The desirable properties of chrome glue as used for paper sizing are enhanced by a new method of drying in a new, improved product—a dry glue of fine, uniform particle size, which is a non-lumping material when prepared in either cold or hot water. This sizing glue is characterized by the absence of free grease, which precludes the formation of "birds eyes" on the finished sheet. The manufacture of this glue under the new drying method also results in freedom from foreign material. It is slightly alkaline, with a pH range of 7.2 to 7.8.

A water soluble product, prepared by the user in approximately 8 per cent solution, this glue is practically water clear in solution. Specifically used for the tub sizing of rag bond paper, it forms a clear protective film that imparts strength, better folding properties, writeability, feel and rattle. *Armour & Co., Adhesive Div., 1355 West 31st St., Chicago 9, Ill.*

Gearmotor

A new "Lifeline" single-reduction gearmotor (Type B) meets the mounting limitation requirements peculiar to side entry agitators and mixers and is suitable for light-duty coupled service applications, such

POSTERS —A POTENT SAFETY TOOL

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the 1951 Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

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as fans and pumps. It is available in ratings from 1 to 30 hp, 780 to 420 rpm, AGMA Classes I and II.

By using reduction gears, gearmotors have the advantage of being able to deliver power at speeds comparable to slow-speed motors while utilizing smaller and more efficient high-speed motors. *Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa.*

New Products Briefs . . .

ELECTRIC FORK TRUCK—A new 2500-lb.-capacity electric fork truck that travels at speeds up to seven miles per hour and makes a U-turn in an 8½-ft. aisle is called the FS-25. New design features include: worm-gear driven power axle, "gyroscopic" trailing axle construction, "Dynamic Braking," etc. *Baker-Raulang Co., Baker Industrial Truck Div., 1230 West 80th St., Cleveland 2, Ohio.*

COUPLER—A newly designed coupler for an 8-in. pipe line has standard flanged connections. A valve is in the coupler body which automatically shuts off the liquid flow when the male part, or nipple, is removed. The coupler is also offered without a valve. The quick connect feature eliminates the necessity of having a maintenance man with tools available for connecting or disconnecting. *Snap-Tite, Inc., Union City, Pa.*

STIRRER—The new 1550 rpm "Hollow Spindle" laboratory stirrer enables the user to raise or lower the propeller while the motor remains in a fixed position. Using only one propeller, the operator can vary its working length according to the size of the vessel employed and place and remove containers by raising the propeller. The "hollow spindle" is actually the motor armature with a 5/16 in. chuck at one end and centering device at the other. *Eberbach Corp., Ann Arbor, Mich.*

PHOTOELECTRIC COUNTER—The new general-purpose photoelectric counter set PIC, completely packaged and easily installed, is very flexible. It consists of a photoelectric control, light source, and electric counter. Remote counting is easily obtained, as one or more electric counters may be placed at any convenient location and wired to the control. *Photoswitch Inc., 77 Broadway, Cambridge 42, Mass.*

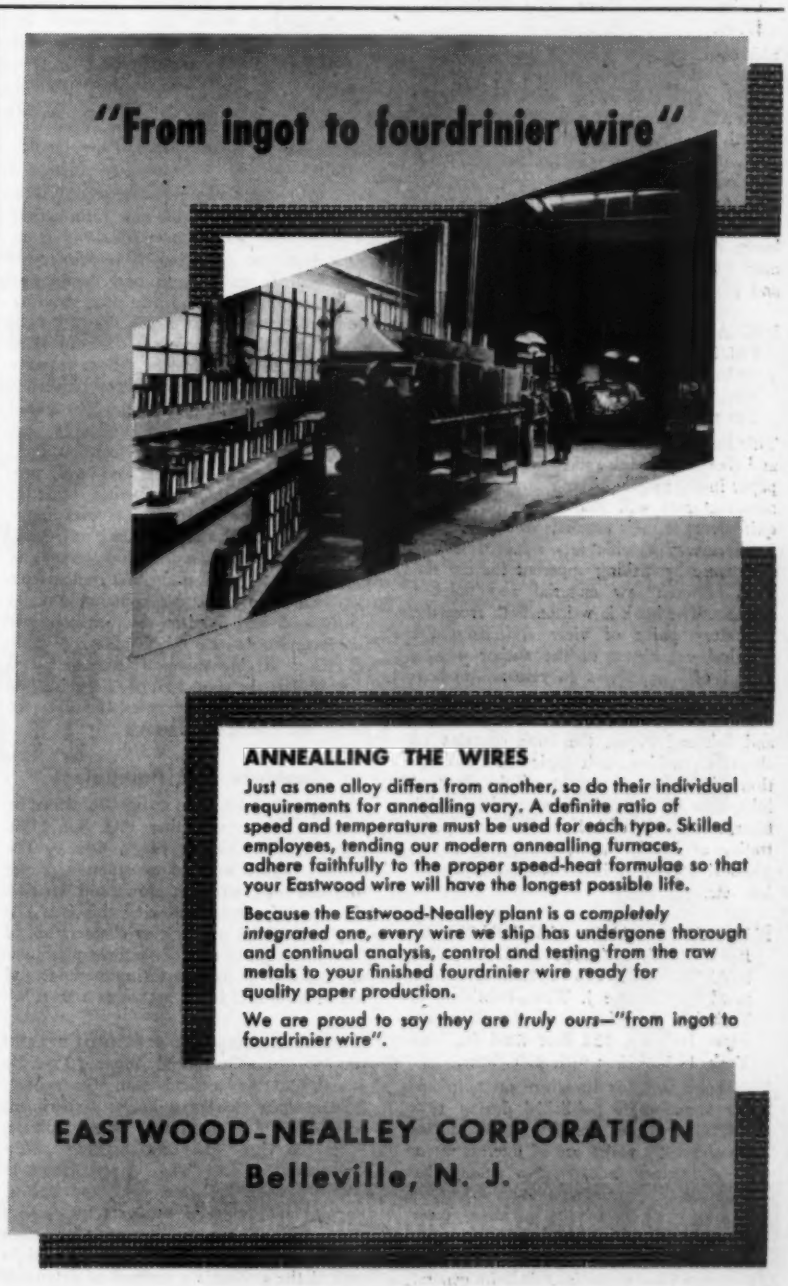
TUBING—An increase in the size range of Superior seamless light-wall tubing from 1¼ in. O.D. maximum to 2-1/16 in. O.D. maximum has been announced. The increased size range is expected to increase the number of applications of light-wall tubing, particularly where pressures exceed the limits for welded tubing. *Superior Tube Co., 1642 Germantown Ave., Norristown, Pa.*

SPECTROGRAPH CHART—A new 17½ x 22½ X-ray spectrograph chart showing characteristic secondary X-ray beams for elements from sodium (atomic #11) to uranium (atomic #92) is available gratis. The chart is suitable for wall display. It will assist scientific personnel in understanding the theory and principles of X-ray spectrography and will be useful in handling actual problems. *Research & Control Instruments Div., North American Philips Co., Inc., 750 South Fulton Ave., Mount Vernon, N.Y.*

OIL BASE PAINT—Hydrocide Colorcoat is a new and different type of exterior oil base coating specially designed for highly porous surfaces. It primes, seals and finishes such surfaces in one application. It also covers and seals cracks and other minor surface imperfections, with a color fast, weather resistant protective coating. *L. Sonneborn Sons, Inc., Dept. P-3, Building Products Div., 80 Eighth Ave., New York 11, N. Y.*

RESIN—A new and improved resin used as a chemical resistant cement which not only provides higher tensile strength and less shrinkage, but also provides improved resistance to oxidizing solutions with better water and thermal stability is known as Fura-Tone 1347. It will not crack, check or warp, such as is common with furfuryl alcohol resin, according to the manufacturer. *Irvington Varnish and Insulator Co., Chemical Products Div., Irvington 11, N. J.*

GLOSS MEASURING UNIT—A new precision gloss measuring unit can be used in the laboratory for accurate determinations of every gloss specimen tested, or it can be used in the plant to show by a deflection method whether each specimen tested falls within or without permissible limits. The apparatus consists of a sensitive electrical measurement unit and five exposure heads, which may be purchased individually. *Gardner Laboratory, Inc., Bethesda 14, Md.*


"From ingot to fourdrinier wire"
ANNEALLING THE WIRES
Just as one alloy differs from another, so do their individual requirements for annealling vary. A definite ratio of speed and temperature must be used for each type. Skilled employees, tending our modern annealling furnaces, adhere faithfully to the proper speed-heat formulae so that your Eastwood wire will have the longest possible life.
Because the Eastwood-Nealley plant is a completely integrated one, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.
We are proud to say they are truly ours—"from ingot to fourdrinier wire".
EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

The Paper Industry New Literature

Books

TROPICAL WOODS & AGRICULTURAL RESIDUES AS SOURCES OF PULP (FAO Forestry Studies No. 3). (English edition only). Published by Food and Agriculture Organization of the United Nations, Rome, Italy. 200 pages. $2.00.

This book is a symposium of thirteen papers on tropical woods and five on agricultural residues, presented at the Fifth Meeting of the FAO Technical Committee on Wood Chemistry at Appleton, Wis., in September 1951. Experts from eight countries have contributed to it: one from Germany, one from Australia, three from Brazil, one from France, one from India, one from Netherlands, five from the United Kingdom, and nine from the United States. Many tables and plates are included.

INK AND PAPER IN THE PRINTING PROCESS. By Andries Voet. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y. 6¼ x 9¼. 220 pages. $5.90.

This book is an introduction to the physics and chemistry of ink and its interaction with paper in the major printing processes. Paper manufacturers will find hints for the requirements of their products in this volume. It represents graphic arts research in the true sense by making apparent the correlations between raw material and finished product. The book is written both from the laboratory point of view and from the practical experience of the author over a period of many years in research and in industry.

Divided into two parts, Ink and Press and Ink and Paper, the book contains 18 chapters covering such topics as the function of ink, measurement of the flow of inks, flow of dispersions, separation of ink films, microscopy of halftone printing, penetration of ink in paper, picking of paper, physical drying of ink, chemical drying of ink, etc.

PULP AND PAPER MANUFACTURE, BIBLIOGRAPHY 1951 AND UNITED STATES PATENTS 1950-1951. Compiled by Clarence J. West. Published by Technical Association of the Pulp and Paper Industry, 122 East 42nd St., New York, N.Y. 6¼ x 9¼. 420 pages.

This book contains literature on pulp and paper manufacture published during 1951 and United States patents issued during 1950 and 1951 which are of interest to the pulp and paper industry. No attempt has been made to cover completely many of the topics of interest to the plant engineer. Articles on machinery, lubrication, power and its many ramifications, safety and similar topics have been included, in general, only when such articles appear in magazines devoted to the pulp and paper industry. Included is a list of journals covered, an author index, subject index, and numerical patent index.

YEARBOOK OF FOREST PRODUCTS STATISTICS FOR 1951. Published by Forestry Division, Food and Agriculture Organization of the United Nations, Rome, Italy. Distributed by International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N.Y. 8½ x 11. 182 pages. Paper-bound. $2.50.

This fifth yearbook prepared by FAO's Forestry Division contains new information for 1950 and revised data for 1949 from more than 100 countries. It is printed in both English and French and contains a Spanish supplement. A world map showing countries reporting to FAO 1949-1950 is presented at the beginning of the book. The book goes on to discuss the salient features of the world situation in 1950, covering wood in the world economy; world trade; wood consumption; lumber production, exports, imports, stocks and consumption; plywood; sleepers; pitprops; wood pulp production and consumption, world trade in wood pulp; newsprint, and fibreboards.

Forty-three tables contain data on roundwood, processed wood, wood pulp and pulp products, world trade, and comparative data. An additional table contains data on roundwood and lumber received too late for inclusion in the other tables. A table of factors of conversion of currencies into U.S. dollars is given. Appendices include technical notes, country notes, definition of terms and converting factors.

Booklets and Pamphlets

THE SOUTHERN PINE STORY. Published by Southern Pine Association, P.O. Box 1170, New Orleans, La. 32 pages. 6 x 9. The booklet begins with an explanation of the southern pine, where it grows and what its characteristics are. Following this is a history of southern pine. Other chapters tell of the wide range of uses of southern pine lumber, describe its manufacturing methods and tell of how it is being grown as a crop.

MARKING GUIDES FOR SOUTHERN UPLAND HARDWOODS (Occasional Paper 125). By Joseph L. Burkle and Sam Guttenberg. Published by Southern Forest Experiment Station, U. S. Department of Agriculture, Forest Service, 704 Lowich Bldg., New Orleans 13, La. The paper discusses southern red oaks, white oaks, and yellow-poplar, and the chief products into which these species are cut, except for tight cooperage bolts and face veneer logs. Main part of the guides is a method of determining when a tree is financially mature. The paper concludes with a set of simple marking guides that can be used in the woods.

WHEN A FELLOW NEEDS A FORESTER (Film). Produced by Southern Pulpwood Conservation Association in cooperation with a group of Southern State Forestry Departments. Available for loan from Extension Film Library, Clemson Agricultural College, Clemson, S. C. This 23-minute 16mm. sound film in color shows the advantages of obtaining the services of a trained forester to aid landowners with the management of their woodlands and tells how a forester may help a landowner solve his tree-growing problems. It goes on to point out the resulting financial benefits to the landowner, and tells how the services of a forester may easily be obtained.

FOREST FIRES YOUR LOSS. Published by Southern Pulpwood Conservation Association, 1506 First National Bank Bldg., Atlanta, Ga. This booklet is a summary of the effects of forest fires on the southern woodlands, pointing out the fallacies of the woodburning custom, the reasons behind forest fires, the amount of damage suffered each year from southern woods fires, present and future fire control activities, and expenditures for forest fire prevention. Comparative charts depict the wasteful effects of fire and the increasing measures taken toward fire prevention.

PUBLICATIONS (Volume XXIII, No. 1a). Published by State University of New York, College of Forestry, Syracuse 10, N. Y. 5½ x 8½. 26 pages. Publications of the College listed in this booklet are of three classes: technical publications which contain original information of a technical or scientific character relating to forestry and forest products; semi-technical bulletins that contain both original and compiled information of permanent value, and non-technical leaflets, folders, and booklets written in popular style for public education and information. They are grouped under the following topics: care and management of forests, forest fungi and tree diseases, forest insects, forest products, forest wildlife, landscape and recreation, pulp and paper manufacture, wood technology, other publications, and publications of the Roosevelt Wildlife Experiment Station.

DIRECTORY OF AMERICAN COUNCIL OF COMMERCIAL LABORATORIES, INC. 1952 Edition. Published by American Council of Commercial Laboratories, Inc., 4302 East-West Highway, Washington 14, D. C. 6¾ x 10. 74 pages. A guide to the leading independent testing research and inspection laboratories of America, this booklet contains the following information: alphabeti-

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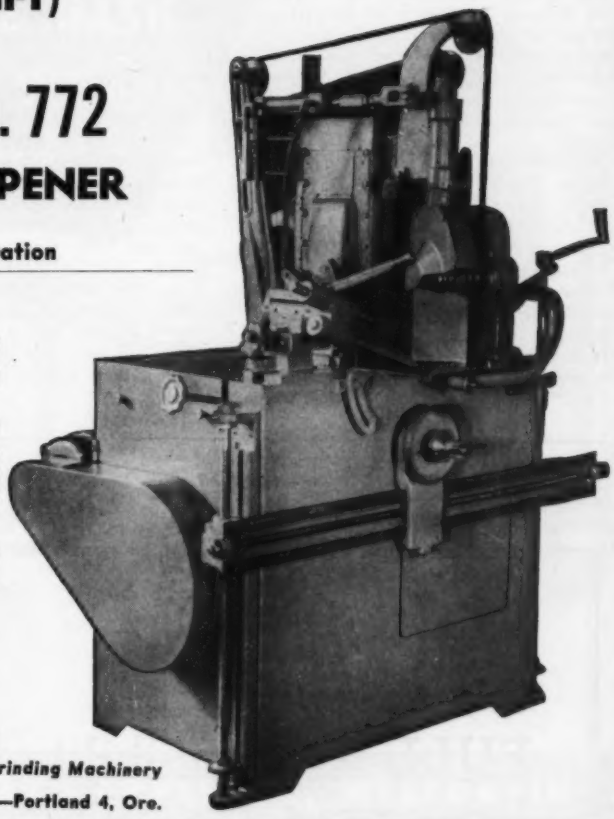

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cal list of member laboratories and the location of their home office; explanation of the A. C. C. L.; address by the president of one of the member laboratories; individual laboratory statements of organization, services, specialties, etc.; personnel index; geographical index of laboratories, and the organization's code of ethics.

SUBJECT MATTER INDEX FOR TECHNICAL NOTES 1-300. Published by Lake States Forest Experiment Station, University Farm, St. Paul 1, Minn. This index lists 300 Technical Notes, issued from May, 1928 to July, 1948, which include information on all the fields in which the Station has conducted research. These Notes are listed by number and title according to the following subject matter classes: Forest Management and Silviculture, Regeneration (seed, nursery, planting), Mensuration (growth, volume, yield, sampling), Protection (fire, insects and diseases, wildlife), Forest Survey (forest resources), Forest Economics, Forest Influences (streamflow, erosion control, climate, shelterbelts), and General.

HANDBOOK OF MANUAL MATERIALS HANDLING EQUIPMENT. Published by Caster & Floor Truck Manufacturers' Association, 27 E. Monroe St., Chicago 3, Ill. $1.00. This handbook is designed to acquaint both industry and the layman with the terminology and basic fundamentals of casters, wheels, hand and floor trucks, pallets and skids. The plan of each section of the manual is to explain what the equipment is, why it is made, how it is made, how it is applied or used, how to determine what is needed, and how to use an equipment catalogue.

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Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Heat & Air Systems. Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.—Six pages of this 8-page booklet contain a schematic diagram of pulp and paper production processes. Also provided are single line drawings illustrating the many important areas throughout production where heat and air systems will prove of great benefit in increasing production, quality and profits. A description of fans and blowers, air heaters, dust collectors, and hood panels is given.

Instrumentation and Control. Foxboro Co., Foxboro, Mass.—8-page Bulletin No. 466 on rapid sand filters instrumentation and control presents a comprehensive description of a system of instrumentation utilizing pneumatic control equipment. Many drawings and photographs of equipment are shown, in addition to a schematic diagram of the instrumentation. A typical layout of a rapid sand filter control system is included.

Laboratory Planning Kit. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.—This kit, which permits custom installations of entire laboratory rooms without blueprints and conferences, contains scaled cut-outs, representing 21 ready-made, pre-engineered steel furniture units. The cut-outs can be manipulated on the kit's graph paper. Also included is a booklet which gives front and side-view dimensional drawings and a complete catalogue of unitized furniture and photographs of suggested laboratory installations.

Pressure Gauges. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windram Aves., Philadelphia 44, Pa.—4-page Specification Sheet 710 describes Brown indicating and recording pressure gauges with pneumatic control. Construction and engineering details are included.

Power Distribution System. Feedrail Corp., 125 Barclay St., New York 7, N.Y.—Bulletin No. 27, containing 4 pages, presents information, including numerous illustrations, on the new heavy-duty Feedrail trolley busway electric power distribution systems.

Signaling Unit. Hammarlund Mfg. Co., Inc., 460 West 34th St., New York 1, N.Y.—A new 4-page folder describes in detail the design, operation and suggested uses of the recently introduced "DSU-2" duplex signaling unit. A photograph showing both the top view and bottom view of the transmitter and receiver with power supply is included, in addition to a block diagram of the unit. Specifications are listed.

Pipe and Tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.—Known as Bulletin TDC-144, this 4-page publication discusses Croloy 18-8 Ti (AISI Type 321) pipe and tubing. Included are condensed data on corrosion resistance, creep strength, oxidation resistance, mechanical properties, machinability, welding characteristics, heat treatment, and physical properties.

Preventive Maintenance. Remington Rand Inc., 315 Fourth Ave., New York 10, N.Y.—"Simplified Preventive Maintenance Control for Plant and Production Equipment" is the title of 4-page Folder KD-705, which describes how a preventive maintenance program can be accomplished by using Kardex visible records, explaining how Kardex schedules and controls machine inspections and maintenance operations with a minimum of paper work. It also outlines the Kardex property records which show all essential facts on the machines and equipment of an organization.

Screw Conveyors & Screw Feeders. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—Comprehensive information on screw conveyors and screw feeders is provided in a new 92-page booklet, No. 2289. The book-

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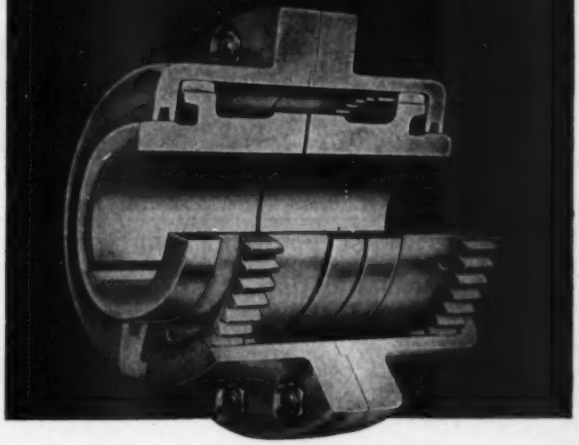


A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

let gives detailed engineering information, with selection tables and horsepower formulas, layouts and arrangements, dimensional data and part numbers. Installation photographs show screw conveyors used for conveying, elevating, heating, cooling and mixing. Typical applications of specialized conveyor screws on farm and industrial equipment are also shown. Engineering data and component specifications comprise 54 pages. Many practical suggestions for correct selection and arrangement of components are included.

Motor Control Centers. Continental Electric Equipment Co., Box 1055, Cincinnati 1, Ohio,—Bulletin No. 400, consisting of 8 pages, describes the various features of "Concentrol" motor control centers in detail. Specifications and approximate dimensions are given, as well as short circuit application data. The three NEMA types are described. An explanation of how to lay out a motor control center is included.

Pressure Gages. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—New 4-page Specification Sheet 708 describes Brown indicating and recording pressure gauges. Construction and engineering details are included.

Detachable Chains. Chain Belt Co., Dept. P. R., Milwaukee 1, Wis.—This 50-page bulletin (52-52), which is of handbook size, explains the step-by-step manufacture of Rex steel detachable chain. Plain chain and attachments are illustrated and described. Tables giving dimensions, weight, prices, strengths, lengths, etc., are included. Steel detachable chain drive and conveyor applications are illustrated.

Boiler Control. Copes-Vulcan Div., Continental Foundry & Machine Co., Erie 4, Pa.—10-page Bulletin 1007 illustrates and describes the new Copes-Vulcan boiler control with instrumentation by Taylor. Included are combustion, feed water, boiler steam temperature and soot blower controls, with standard or miniature instruments and conventional, console or graphic panels.

Sheet Metal Fabrication. Kirk & Blum Mfg. Co., 3158 Forrer St., Cincinnati 9, Ohio—A new "Sheet and Plate Fabrication" brochure, containing over 40 pages of illustrations of the Kirk & Blum fabricating plant and manufacturing facilities, also gives a comprehensive view of many of the typical parts and products the firm regularly manufactures.

Welding Accessories. A. O. Smith Corp., Welding Div., Milwaukee, Wis.—This 16-page catalogue offers customers a complete line of welding accessories and makes ordering and shipment easier.

Gages, Machine and Cutting Tools. Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford 1, Conn.—This 8-page booklet shows, in condensed form, the broad scope of Pratt & Whitney products offered to industry, giving an illustration and brief description of each product.

Speed-Reduction Drives. American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa.—The new "Shaft-King" shaft-mounted speed-reduction units are illustrated and described in a recently published catalogue, which gives complete information and dimensions of units, where they are used and how they are installed, including instructions on how to select the correct size unit for a given application. Cutaway and phantom drawings illustrate details of construction.

Rigid Polyvinyl Chloride. Atlas Mineral Products Co., Mertztown, Pa.—This 16-page bulletin, No. 9-1, describes "Ampoflex", rigid polyvinyl chloride, a self-supporting material for corrosionproof construction. Resistance characteristics are listed under the following topics: acids, alkalies, acid salts, alkaline salts, neutral salts, gases, organic materials, paper mill applications, etc. Three magazine article reprints which are included are: "Fabricated Plastics in the Plating Industry," "Plastics Equipment Reference Sheet," and "Plastic Processing Equipment Today."

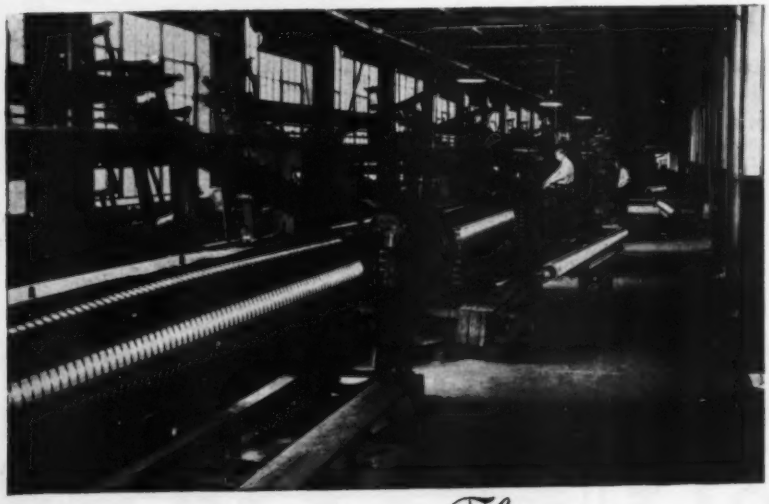
Valves. Edward Valves, Inc., Dept. CS, 1200 West 145th St., East Chicago, Ind.—This 56-page catalogue covers cast steel valves. Included is complete information on globe, angle and check valves in 300, 600, 900 and 1500 lb. pressure classes. Parabolic disk valves for hand or motor control of volume are also described in detail. In addition to the standard information on construction features, dimensions, weights, etc., the booklet contains complete information on material specifications, preparation of welding ends, flange facings, pressure-temperature ratings and all other technical data required for valve selection.

Steel Plate Fabrication. Biggs Boiler Works Co., Akron 5, Ohio—Steel plate fabrication of stainless, carbon-moly, coated, clad or mild steels, welded or riveted to ASME specifications in exceptionally heavy gauge and wide widths, is discussed in 6-page Bulletin 531. Plant facilities and examples of lined chemical tanks, pressure vessels, rotary kilns, dryers, cable drums, etc., are given.

Voltammeter. Associated Research, Inc., 3758 W. Belmont Ave., Chicago 18, Ill.—Specifications and performance data on Model 601 ac/ voltammeter are given in a new bulletin (6AA).

Paper Mill Equipment. Westinghouse Electric Corp., P.O. Box 868, Pittsburgh 30, Pa.—Bulletin B-5794, containing 4 pages, lists current booklets on equipment for the paper industry, together with photographs of these booklets and a brief description of each. Also included is a list of buying data on all Westinghouse products of interest to the paper industry, and list of current reprints.

Carbon Blacks. Binney & Smith Co., 41 East 42nd St., New York 17, N.Y.—This 4-



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Pulp Bleaching (A Symposium)	.50
Technology of Papermaking Fibres	.50

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page bulletin contains technical data on carbon blacks, bone blacks, iron oxide colors, base dispersions, aqueous dispersions, and rubber blacks.

Elevators & Cranes. Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill.—In this 36-page bulletin, No. 5211, portable elevators are shown in hand and electrically operated types, and with single, hinged and telescopic uprights. Also illustrated and described are pallet elevators; barrel elevators, including drum dumping types; platform loading and balcony elevators; revolving base elevators; four-post elevators for heavy duty, and floor-to-floor (stationary) elevators. The characteristics of Barrett elevators are illustrated in detail, including their saftey features. Operating views are shown.

Polyvinyl Methyl Ether. General Aniline & Film Corp., Commercial Development Dept., 435 Hudson St., New York, N.Y.—This new 12-page bulletin describes polyvinyl methyl ether, which may be used in adhesives, surface coatings, paper, textiles, heat-sensitized latices, and other fields.

Luminaires. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.—A 24-page pocket catalogue of fluorescent commercial and industrial luminaires, designated as B-5799, is now available. Detailed descriptions accompanied by photographs and diagrams of each of the luminaires tell where the respective types are best applied, what models are available, the features of each, and their dimensions. In addition, a 4-page table provides convenient access to standard data on all the luminaires. The style number, description, and price of each is given.

Stainless Steel. Armco Steel Corp., Middletown, Ohio—Third in a series of wall charts covering fabricating and finishing of stainless steel, this latest 25 x 38 in. two-color chart pictures and describes the principal steps in weld bead finishing and includes a series of photographs on how to get the best results in surface finishing. Also included is a handy table listing the sequence of operations and recommendations for wheel speeds, abrasives and lubricants for grinding and polishing stainless steels.

Pillow Blocks. Dodge Mfg. Corp., Mishawaka, Ind.—Bulletin A-620, which consists of 8-pages, describes the new all-steel Dodge-Timken pillow blocks. A full-color cutaway view of the pillow block is shown, Technical information which should prove helpful to any engineer in determining whether this pillow block will solve a problem for him is given. Data presented enables the engineer to select the right size for any particular application.

Latices, Cements & Solvents. Union Bay State Chemical Co., 491 Main St., Cambridge 42, Mass.—Users of latices, cements and solvents who are interested in knowing how a chemical manufacturer equips his plant and controls production will find this 24-page 50th anniversary brochure of interest. A brief history of the company is given and photographs and short biographical sketches of personnel are included.

Diaphragm Motor Valves. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—The Honeywell Series 700 double-seated diaphragm valve is fully described and illustrated in a new 8-page Specification Sheet 400-4. Pertinent data such as sizes, construction, trim materials, temperature pressure ratings for various body materials, pressure drops and complete mounting dimensions are given. Also described are the various types of discs available and some of the major design advantages.

Water Suction Hose. B. F. Goodrich Co., Akron, Ohio—A new 4-page catalogue on water suction hose describes four types of hose which cover all suction hose service. A table lists types of fittings and their recommended uses. The catalogue also lists specifications, describes materials and methods used in construction of the hose and recommended uses.

V-Belts. Thermoid Co., 200 Whitehead Rd., Trenton, N. J.—A new 8-page catalogue (Form 3787) on V-belts for industrial use is now available. New simplified conversion tables whereby a user can determine quickly and easily the correct Thermoid belt to replace the belts of other manufacturers are a feature of this publication. Prices, dimensions, weights and construction details are also presented.

Close-Coupled Pumps. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee, Wis.—Construction features of the supporting-adapter type, close-coupled general purpose pump in capacities to 2500 gpm at heads to 550 ft. are described and shown in this 6-page bulletin (52B6083A). Alternate sealing arrangements available are diagrammed, and a table of dimensions is given.

Gas Meters. Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.—This new 16-page booklet, M-152, on meters for measuring gases of any type, in quantities from 4,000 to 1,000,000 cu. ft., contains detailed descriptions and illustrations of meters of various types. It also contains a useful selection table to determine the meter required for any load, whether at standard or variable conditions of temperature and pressure.

Timing Relays. Allen-Bradley Co., Milwaukee, Wis.—Fluid dashpot, pneumatic, and electronic timers are fully described in this 16-page bulletin. The bulletin also contains complete operation and engineering data. Applications are clearly stated. Timers are shown in a wide variety of standard enclosures. A selector chart is provided along with suggestions on the various factors to consider in choosing a timing relay for a particular application.

Mill Whites. Arco Co., 7301 Bessemer Ave., Cleveland 27, Ohio—Arco mill white paints are described in a new catalogue-type folder containing 4 pages. One section of the folder covers Dado enamels and includes color chips. Specifications, application directions, drying time and coverage figures are arranged for easy reference in the folder's inside pages. The text is enlivened with "before and after" illustrations, showing plant work spaces cleaned and brightened with mill whites.

Valves. Lunkenheimer Co., Box 360U, Cincinnati 14, Ohio—Design and construction features of Lunkenheimer's line of 125-lb. pressure globe, angle and check bronze valves are described and illustrated in this 4-page circular. Large sectional views of these valves showing their features in complete detail are included, in addition to tables of dimensions.

Rotary Pumps. Worthington Corp., Reciprocating Pump Div., Harrison, N.J.—16-page Bulletin W-483-B2 on heavy-duty rotary pumps covers both the herringbone gear type and the sliding-vane type. Fields of application, coverage charts, mountings and dimensions are given. Engineering data includes a viscosity conversion table, a table showing the relation of A.P.I. hydrometer scale to specific gravity, and a viscosity-temperature chart for fuel oils.

Rotary Distributors. American Well Works, Aurora, Ill.—18-page Technical Supplement "RD" gives comprehensive design data and information on reaction driven and positive motor driven rotary distributors and dosing siphons, for rapid or standard rate sewage filters, sand filters, or for water aeration. Design, construction, operating and performance features are fully explained. Important details are visualized in photographs, cross-sectional drawings, and operating diagrams.

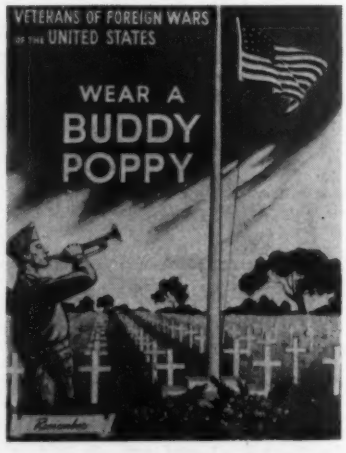
Diesel Engine. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.—A new 12-page bulletin (Form 10027) on the small, light, heavy-duty TS Diesel engine contains wash drawings, installation views and diagrams of this engine. Specifications, weights, performance curves, and dimension tables are also included.

Pipe & Fittings. National Carbon Co., Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.—Catalogue Section S-7000 covers "Karbate" brand impervious graphite pipe and fittings. It is profusely illustrated and contains many tables of standard sizes for pipe and fittings, flexible couplings, connectors, parts and accessories, centrifugal pumps and globe valves. Threading and serrating tools and assembled fittings are described and illustrated. Engineering information also is included as a guide in the design and operation of "Karbate" equipment in the chemical and process industries. A chart of "Do's" and "Dont's" of installation practices is included for ready reference.

Fire Extinguisher. Stop-Fire, Inc., 125 Ashland Place, Brooklyn 1, N. Y.—2-page Bulletin SF-1001 describes a new, fast-flowing dry chemical extinguisher known as the "Redi-Flo." The bulletin presents complete details on construction and performance of this unit, in addition to descriptive data on "Dri-Kem," a new, non-caking dry chemical extinguishant employed in the "Redi-Flo."

Magnesium Ramps. Penco Engineering Co., 25 California St., San Francisco 11, Calif.—Two new magnesium ramps, the flared ramp for car loading operations and the two-section ramp for truck loading operations, are fully detailed and illustrated in this 2-page bulletin.

Compressors. Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.—Oil-free compressors are discussed in 4-page Bulletin A-92. Specifications shown include Joy's complete line of non-lubricated compressors from 172 to 8800 cfm, 25 to 600 hp.



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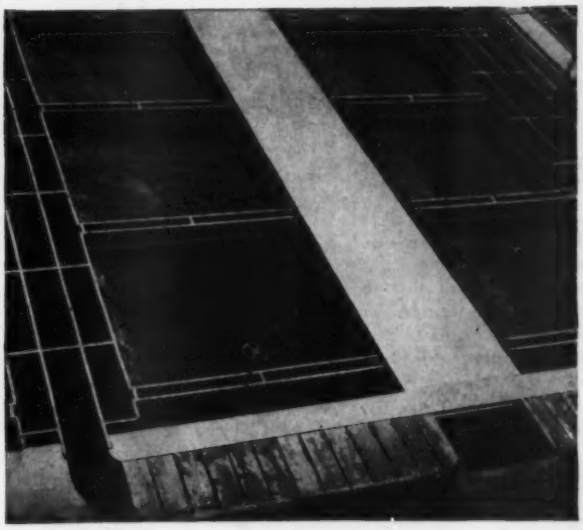

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If awards were given for making good paper, it would be found that the winners were regular users of Cambridge Surface Pyrometers. Every paper man knows that to produce quality paper the proper surface temperature of each roll in the drying roll train must be maintained. The Cambridge Surface Pyrometer is an accurate, rugged instrument that quickly and easily indicates the roll surface temperatures. It is so convenient to use that workers willingly use it. The CAMBRIDGE is made in the hand model or with an extension attachment to reach those hard-to-get-at places.

Write for bulletin 194-SA

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RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York:

No. 1 White Shirt Cuttings	13.50 to 14.00
New Unbleached Muslins	15.00 to 16.00
Fancy Shirt Cuttings	6.75 to 7.25
No. 1 Percales	6.75 to 7.25
No. 1 Washables	4.00 to 4.25
No. 1 Light Silesias	8.00 to 8.50
No. 1 Light Prints	6.50 to 7.00
Light Flannelettes	8.00 to 8.50
Cottonades	4.25 to 4.50
Blue Overalls	7.00 to 7.50
Blue Cheviots	7.00 to 7.50
Canton Flannels, Bleached	11.50 to 12.00
Canton Flannels, Unbleached	11.50 to 12.00
Osnaburg Cuttings	8.00 to 8.50
Underwear Cuttings, Bleached	15.00 to 16.00
Underwear Cuttings, Unbleached	15.00 to 16.00
Khaki Cuttings—	
Sun Tan	8.50 to 9.00
Mixed	4.00 to 4.25
Linen Cuttings—	
American	9.00 to 10.00
White	15.00 to 16.00
Grey	15.00 to 16.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.25 to 1.35
No. 2	.95 to 1.05
No. 3 and 4	.80 to .90
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	5.50 to 5.75
Miscellaneous	4.75 to 5.00
White, No. 2—	
Repacked	4.50 to 4.75
Miscellaneous	3.75 to 4.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	4.75 to 5.00
Domestic	4.75 to 5.00
Wool Tares—	
Light	5.75 to 6.00
Heavy	6.00 to 6.25
No. 1 Scrap Bagging	4.25 to 4.50
Manila Rope—	
No. 1 large	6.75 to 7.00
No. 1 small	5.75 to 6.00
Sisal Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.50 to 5.75
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	6.75 to 7.25
Domestic	6.75 to 7.25
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	3.00 to 3.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	115.00 to 125.00
Hard White No. 1	85.00 to 90.00
Soft White, one-cut	75.00 to 80.00
Soft White, No. 1	60.00 to 65.00
Coated Soft	45.00 to 50.00
Fly Leaf No. 1	25.00 to 30.00
Fly Leaf, Woody No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	20.00 to 22.00
Mixed Books	14.00 to 15.00
Ledger Stock—	
No. 1 White	55.00 to 60.00
No. 1 Mixed (Colored)	35.00 to 40.00
Manilas—	
New Env. Cuttings	65.00 to 70.00
New Env. Cuts, One-Cut Extra Manilas	22.50 to 25.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	40.00 to 45.00
No. 1 Old Assorted	30.00 to 35.00
News—	
White Blank	55.00 to 60.00
Overissue	24.00—
No. 1 Folded	18.00—
Old Corrugated Containers	22.00—
New Jute Corrugated Cuts	26.00—
Mill Wrappers	14.00—
Box Board Chips	11.00—
No. 1 Mixed Paper	10.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	23.00—
Argentine, lb.	17.00 to 17.50
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tanks cars (wks) cwt.	2.90—
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	44.00 to 44.50
Litharge, powd. bbl. lb.	.13¾ to .14¼

MARKET QUOTATIONS

Rosin (Gum)—	New York, per 100 lbs.
E	8.40—
F	8.40—
G	8.40—
WW	8.75—
Rosin (Wood), carlots,	
F.O.B. South	4.50 to 4.75
Salt Cake—	
Dom. bulk (wks) ton	17.00 to 23.00
Imp. bulks on dock—	
(Atl. ports) ton (Nom.)	22.00—
Soda Ash—	
Bulk (works) cwt.	1.35—
Paper bags, cwt.	1.65—
Soda (Caustic)—	
Solid drums, cwt.	3.35 to 3.40
Ground and flake, drums,	
cwt.	3.75 to 3.85
Sodium Silicate—	
60 deg. 55 gal. drums,	
(works) cwt.	1.60 to 1.70
40 deg. 55 gal. drums,	
(works), cwt.	1.30 to 1.40
Starch—	
Pearl, 140 lb. bags, cwt.	6.39—
Pearl, barrels, cwt.	6.39—
Paper (Sp.) bags, cwt.	6.39—
Powdered, barrels, cwt.	6.60—
Sulphur (Crude)	
(Mine) bulk, long ton	25.50 to 27.50
Talc—	
Dom. 100 lb. bags (mine)	
ton	25.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	.21 to .21½
Calcium Pig, bbls., lb.	.21 to .21½
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	140.00—
Bleached Sulphite, Canadian	145.00—
Unbleached Sulphite	125.00 to 132.50
Unbleached Sulphite, Canadian	130.00 to 135.00
Bleached Soda	140.00—
Bleached Soda, Canadian	140.00—
Kraft, Bleached	145.00—
Kraft, Bleach., Southern	142.50 to 150.00
Kraft, Bleach., Canadian	145.00 to 150.00
Kraft, Unbleached, Northern	132.50—
Kraft, Unbleached, Southern	100.00—
Kraft, Unbleached, Canadian	100.00 to 125.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	82.50 to 87.50

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish	130.00 to 140.00
Bleached Sulphite, Norwegian, freight allowed	140.00—
Bleached Sulphite, Finnish, freight allowed	140.00—
Unbleached Sulphite, Swedish	110.00 to 115.00
Unbleached Sulphite, Finnish, freight allowed	120.00 to 125.00
Kraft, Unbleached, Swedish	100.00 to 105.00
Kraft, Unbleached, Finnish, freight allowed	105.00 to 135.00
Kraft, Bleached, Swedish	137.50 to 142.50
Kraft, Bleached, Norwegian	

PAPER

Boards—

Prices per ton, delivered, 10 tons or more:

Plain Chip	70.00—
News vat lined chip	82.50—
Filled news	82.50—
Solid news	85.00—
White vat lined chip	115.00—
Chip tube and can stock	90.00—
Single manila lined chip	120.00—
Single jute lined chip	115.00—
White patent coated:	
.020	155.00—
.018	157.50—
.016	160.00—

Book Paper—

Coated two sides	
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases $17.25 Carloads $16.30
45 lb. enamel, 25x38-500, trimmed 4 sides	4 cases $13.05 Carloads $12.10
Uncoated	
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases $14.80 Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases $14.05 Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads $12.40
16 lb. tablet, 17x22-500	Carloads $11.25

Rag Content Bond—

Extra 100% rag	70.45—
100% rag	62.65—
75% rag	48.15—
50% rag	38.90—
25% rag	31.75—

Rag Content Ledger—

Extra 100% rag	72.65—
100% rag	63.90—
85% rag	52.50—
75% rag	49.40—
50% rag	40.20—
25% rag	33.00—

Sulphite Bond—

Air dry bond (Watermarked)	19.00—
No. 1 bond (M.F. watermarked)	15.00—
No. 2 bond (M.F. watermarked)	14.00—
Plain bond (M.F. unwatermarked)	14.00—

Sulphite Ledger—

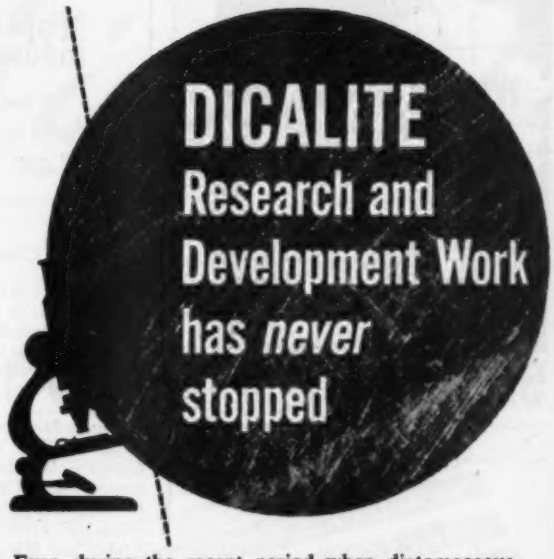
No. 1, M.F. watermarked	20.50
No. 2, M.F. watermarked	19.50
Plain, M.F. unwatermarked	19.00

News—	per ton
Rolls, Standard (Contract)	123.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—

Tissues (Carlots)—	per ream
White No. 1	1.85—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.75—
Manila	2.00—
Napkins, semi-crepe (13¼ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (13¼ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	9.45—
Toilet, Unbleached (M shts.) per cs.	8.00—

Towels	per case
Bleached	6.95—
Unbleached	5.90—

Wrappings (Kraft)—	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls	8.25—
Standard bag, mill rolls	7.50—
Shipping sack, mill rolls	7.75—
Gumming, mill rolls	8.00—
Asphalting, mill rolls	7.75—
Envelope, mill rolls	9.25—



Even during the recent period when diatomaceous materials were in critically short supply, Dicalite steadily continued the research which had already made many contributions to industrial processing.

Look at the brand-new product pictured here – developed by Owens-Corning Fiberglas Corporation. It is a battery separator, made of Fiberglas, in which Dicalite serves so well as a filler because of its unique physical characteristics. Dicalite engineers worked with the technical staff of the manufacturer, who is now using a specially selected Dicalite material which is a vital part of the separator composition.

The problem may just as well have concerned filtration, insulation, or any other Dicalite application. Constant research and development work is one strong reason why Dicalite can serve you better, not only in variety and quality of products but in dependability as well. Perhaps you have a problem where this service may be helpful. A Dicalite engineer will gladly call at your request.

LEFT – An enlarged edge-view of the new Fiberglas battery separator which promises longer life for car and industrial batteries since it is completely insoluble in battery acids. At right is the main portion made of a composition containing Dicalite, which contributes two important advantages: extreme resistance to the acid, and high porosity.

See "Diatomaceous Earth," in the February issue of Industrial and Engineering Chemistry. Write for your copy of our reprint to Dept. C275, Dicalite Division.

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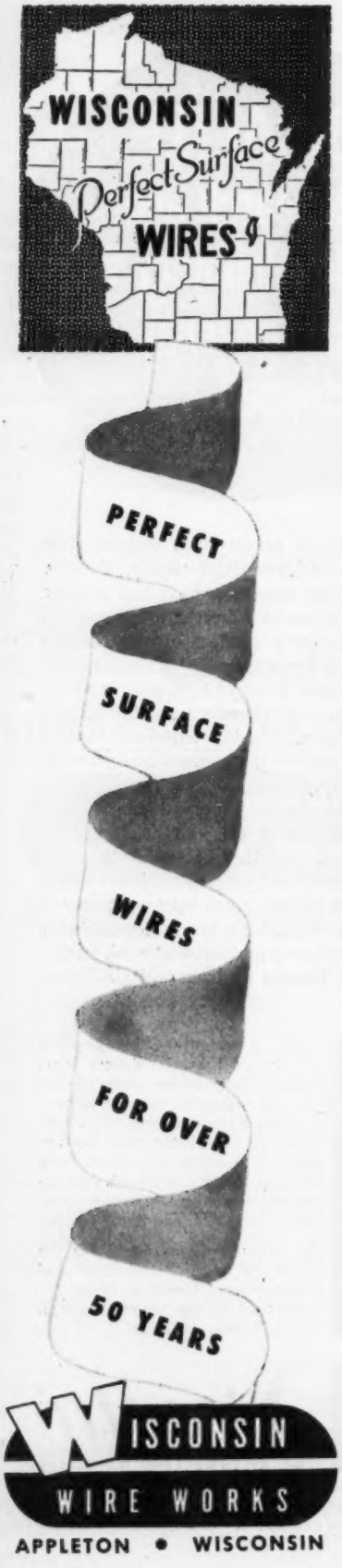

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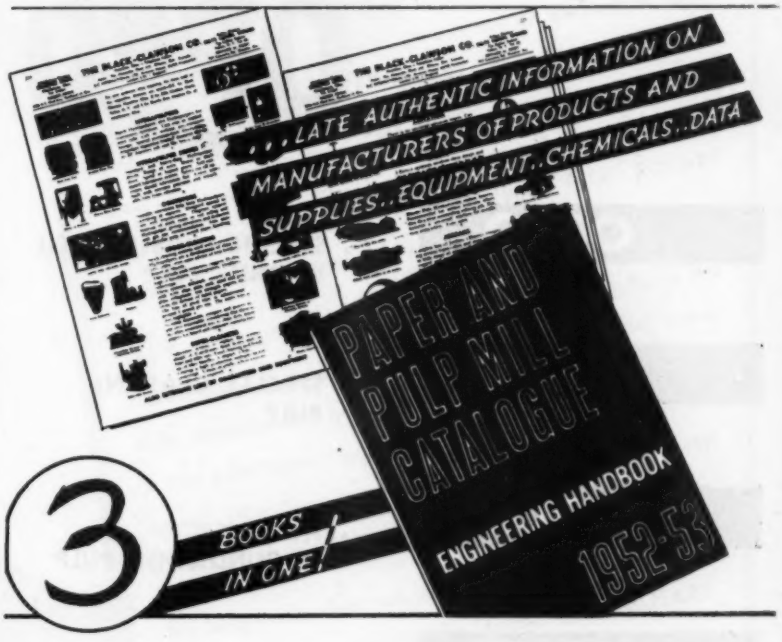
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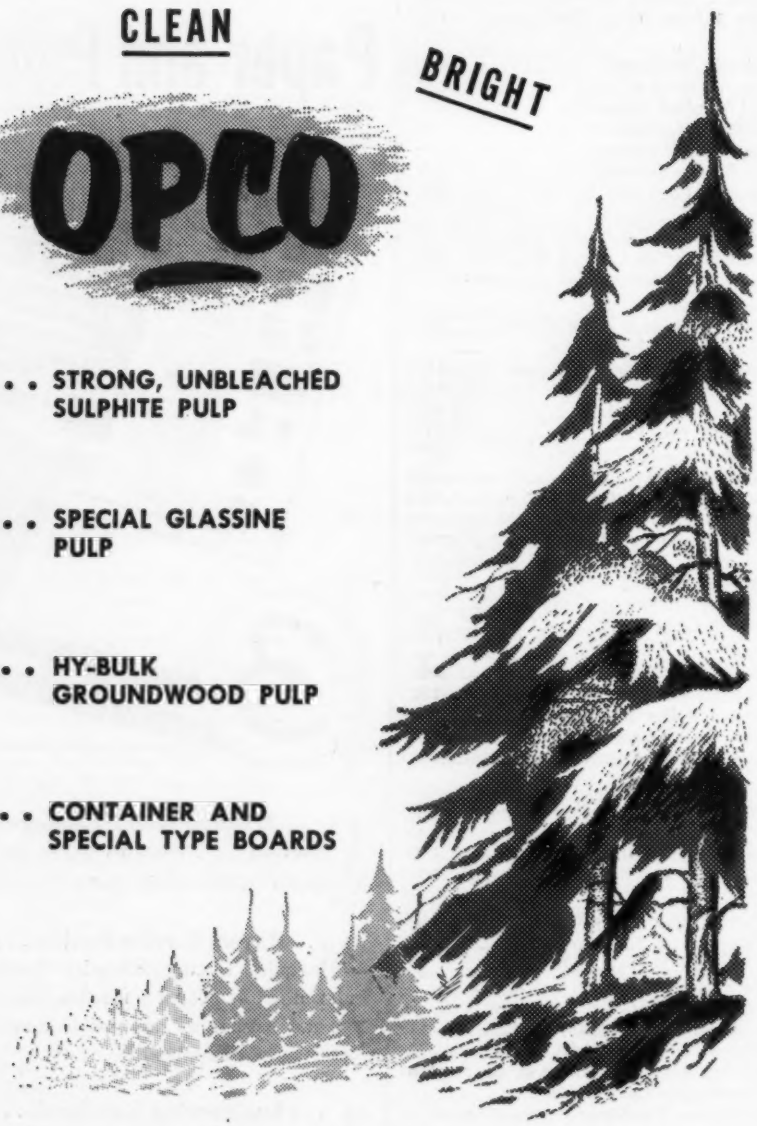

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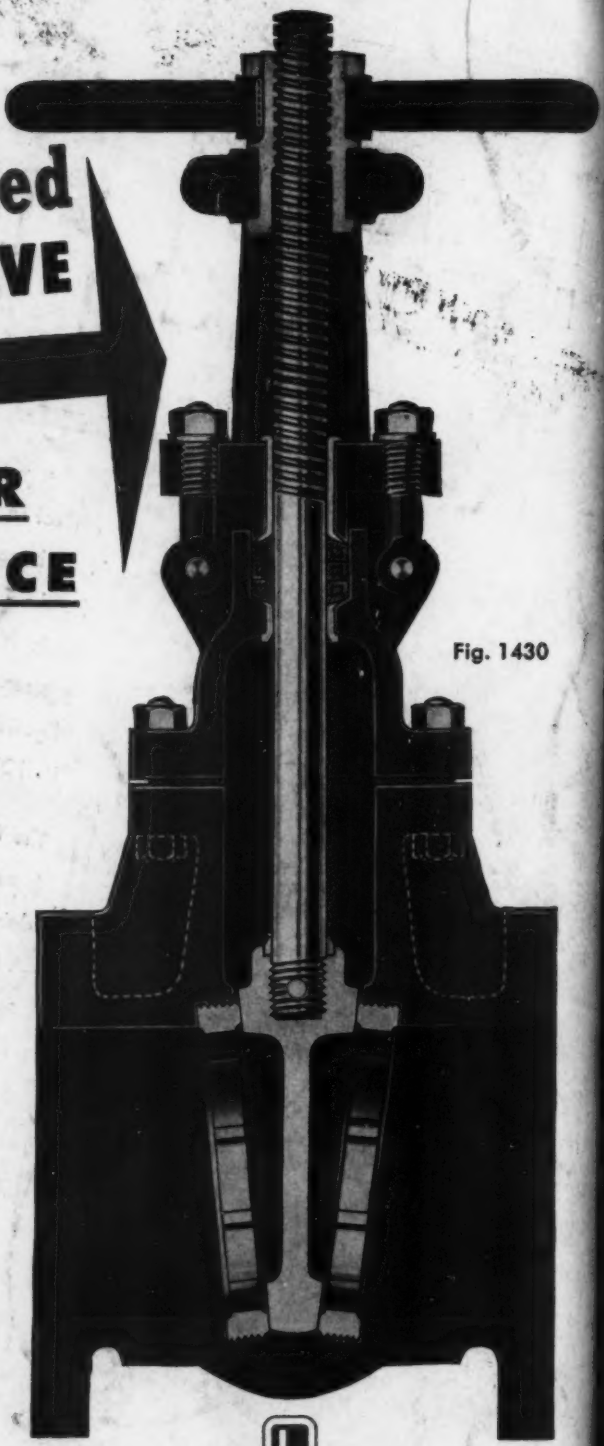

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